July, Aug, Oct, Dec.
UNIVERSITY of ILLINOIS.

THE MARKETS & CROPS.

SUPPLEMENT TO THE

Natal Agricultural Journal.

30TH JULY, 1909.

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THE MARKETS & CROPS.

Supplement to the "Natal Agricultural Journal."

30th July, 1909.

THE LOCAL MARKETS.

LATEST SOUTH AFRICAN PRICES.

MARITZBURG.

Live Stock and Animal Produce.—Beef, fresh, 1d to 4d per lb; beef, salt, 3d to 4½d per lb; buck, 3d to 6d per lb; butter, fresh, 1s 3d to 1s 8d per lb; ducks, 2s 6d to 3s 9d per pair; eggs, 9d to 1s 3d per dozen; fowls, each: live 1s 3d to 2s, dressed 1s to 3s; guinea fowls, 4s 6d to 5s 6d per pair; ham, 7d per lb; hares, 1s to 1s 9d each; mutton, 3d to 6½d per lb; partridges, 1s 9d per brace; plucks, 3d to 7d each; pork, 3d to 5½d per lb; suet, 3d to 3½d per lb; trotters, 1d to 3d per lot; turkeys, hens, 4s 3d each.

Vegetable Produce.—Beans, 7s to 10s per 100 lbs; beetroot, 1d to 5d per lot; cabbages, 1s to 2s 6d per dozen; carrots, 2d to 5d per lot; cauliflowers, 9d to 3s 6d per dozen; celery, 1d to 5d per lot; chillies, 1d to 3d per lot; eschalots, 1d to 3d per lot; forage, 4s 9d per 100 lbs; hay, 10d to 1s 3d per bale; herbs, 1d to 3d per lot; lettuce, 1d to 3d per lot; mealies, 4s 6d per 100 lbs; peas, green, 1d to 7d per lot; potatoes, per 100 lbs: table 7s to 10s, seed, 7s to 11s; sweet potatoes, 4s to 4s 6d per sack; pumpkins, 9d to 4s 6d per dozen; radishes, 1d to 3d per lot; tomatoes, 2d to 8d per lot; wood, per 100 lbs: cut 8d, uncut 5d to 6½d. *Fruit.*—Bananas, 9d to 1s 9d per 100; bananas, 5d to 2s per bunch; grenadillas, 3d to 6d per lot; lemons, 2d to 6d per lot; oranges, 3d to 1s 3d per 100; queen pines, 3d to 4s 6d per dozen; pineapples, 3d to 1s 6d per dozen.

POLLITZER & CO., DURBAN, PRODUCE BUYERS.

HENWOOD'S sell CUTLERY & PLATED GOODS.

DURBAN.

The Market Master reports the following prices realised on the market on the 27th July:—

Live Stock and Animal Produce.—Sucking pigs, 5s each; fowls, 1s 9d each; ducks, 2s 3d each; turkeys, 8s each; guinea fowls, 3s each; dressed fowls, 1s 6d each; rabbits, 1s 3d each; bacon, 8d per lb; eggs, 1s 4d per dozen; ham, 9d per lb; meat, other than pork, 2d per lb; butter, 1s 6d per lb; cheese, 9d per lb; pork, 4d per lb.

Vegetable Produce.—Beans, yellow, 10s per muid; earth nuts, 6s per muid; potatoes, 16s 6d per muid; pumpkins, 3s per dozen; sunflower seeds, 3s per pocket; sweet potatoes, 5s per pocket. *Fruit.*—Bananas, 1s per 100; oranges, 2s per 100; naartjes, 1s 6d to 100; mandarines, 2s per 100; Avocada pears, 3s per dozen; pineapples, 6d per dozen.

PRETORIA.

Messrs. M. Guinsberg & Co., Box 12, Pretoria, report as follows relative to the Pretoria market on the 23rd July:—

Live Stock and Animal Produce.—Butter, 1s 3½d to 1s 6d per lb; ducks, 2s 6d to 3s each; eggs, per dozen: new laid 1s 6d to 1s 9d, fresh 11d to 1s 3d, stale 6d to 9½d; fowls, 1s 3d to 3s 6d each; guinea fowls, 2s 7d to 2s 11d; pigs, 15s to 68s each; turkeys, each: cocks 7s 6d to 8s 6d, hens 4s to 5s 9d.

Vegetable Produce.—Bran, 8s 3d to 9s 3d; beans, 13s to 14s 3d per 200 lbs; Boer meal, sifted, 32s 6d per 200 lbs; bedding, 3d to 4d per bale; chaff, pressed, 1s 8d to 1s 9d per bale; forage, per 100 bundles: best 20s to 25s, second quality 15s to 17s 6d; forage, 12s 9d to 13s 6d per bale; hay, pressed, 2d to 10d per bale; Kafir corn, per 200 lbs: white, 8s 3d to 8s 9d, red 9s to 9s 9d, mixed 7s 7d; mealies, per 200 lbs: yellow 8s 5d to 9s 6d, white 8s 2d to 8s 10d, mixed 8s to 8s 6d; manna, 8s to 10s per 100 bundles; monkey nuts, 7s to 8s per bag; oats, seed and feed, 7s 9d to 9s per 150 lbs; onions, dry Colonial, 12s to 14s 6d per 120 lbs; potatoes, per 150 lbs: best 21s 6d to 25s, medium 17s 6d to 20s, inferior 13s to 16s; sweet potatoes, 3s 9d to 6s 6d per 120 lbs; sunflower seed, 6s to 6s 9d per 100 lbs; wheat, 24s to 28s 6d per 200 lbs; wood, 16s to 43s per load. *Fruit.*—Oranges, 2s to 4s per 100.

REMARKS.

Mealies are coming in in enormous quantities, and with the sudden collapse of the Home market prices are coming down in consequence.

SEND YOUR PRODUCE FOR DISPOSAL TO—

HENWOOD'S sell CROCKERY, LINOLEUMS & CARPETS.

Market closed easy, tendency for lower values, buyers holding back. Kafir corn plentiful, market weak. Other grain, very little arriving; values firm. Forage, hay and bedding plentiful; values remain unchanged. Chaff scarce, prices firm. Potatoes continue to arrive in sufficient quantities; values remain unchanged; demand very good, and firm. Onions scarce, market firm. Poultry is still scarce and prices firm. Eggs have been coming in in large quantities, and market overstocked; values have collapsed since reporting last. We recommend clients to hold back if possible.

JOHANNESBURG.

The Keeling Agency, Ltd., Box 220, Johannesburg, report as follows relative to the Johannesburg market on the 22nd July:—

REMARKS.

Mealies: *Morning* and *Wholesale* values show a slight decline on last week. *Export* values have also fallen during the past two days, and prompt sales would average 8s 7d to 8s 9d; fair average, 8s 10d to 9s. Choice Flat Whites, 8s 3d to 8s 5d. Choice Flat large Yellows, 8s to 8s 3d, fair average White and Yellows, Round or Cangos. But unless European values continue to fall, however, top prices may be expected for parcels definitely held against orders. Kafir corn: Values practically unchanged, but comparatively good prices have been paid for parcels awaiting orders. Beans: Common and mixed easy; Kafirs stationary, from 14s 3d; table, 25s to 30s: specially selected up to 45s. Potatoes, forage, chaff, lucerne, oats, wheat: Market firm and values slightly improved, but only for good and best descriptions.

PRICES OBTAINED.

Live Stock and Animal Produce.—Oxen, prime, £10 10s to £13 (average 30s to 32s 100 lbs); poor to medium, £7 to £8 15s (average 22s 6d to 25s 100 lbs); lambs, prime, 9s to 12s 6d (average 4d to 4½d lb); sheep, prime, 15s to 18s 6d (average 3¾d to 6¼d lb); sheep, poor and medium, 7s 6d to 12s; goats (Boer kapater), 13s 6d to 16s (average 3½d to 3¾d lb). Dead weight average is given merely to enable suppliers to estimate value of small and large stock. Pigs, 3d to 4½d per lb (live weight. One lot of specially prime cattle was sold at £14. Market generally lower, but firm for prime stock and pigs. Fowls, 1s 9d to 3s each; ducks, 2s to 2s 9d each; geese, 4s 6d to 5s 9d each; turkeys, each: hens 4s 6d to 7s, cocks 8s to 14s; eggs, fresh, 9d to 11½d per dozen; butter, fresh, 11d to 1s 2½d per lb.

— POLLITZER & CO., BOX 407, DURBAN.

HENWOOD'S sell IRONMONGERY & FURNITURE.

Vegetable Produce.—Barley, good, 11s to 13s per 153 lbs; bran, wheaten, 7s 6d to 8s 2d per 103 lbs; beans, sound, 13s to 45s per 203 lbs; chaff, wool bales and compressed, 2s 9d to 4s 9d per 100 lbs; forage, per 100 lbs: best short heavy 6s 3d to 6s 6d, inferior to medium 3s 6d to 5s 9d; grass and hay, veld, 7d to 1s per bale; grass, sweet and special, 1s 3d to 1s 9d per bale; Kafir corn, per 203 lbs: red mixed 8s 6d to 8s 9d, white mixed 7s 11d to 8s 2d, white 7s 10d to 8s 1d; lucerne, 5s 6d to 6s 9d; manna, 3s to 5s 3d; mealies, per 203 lbs: hickory and tooth 8s 11d to 9s 1d, small, white flats 8s 10d to 9s, white, Cangos, 8s 9d to 8s 11d, yellow 9s to 9s 3d, mixed 8s 9d to 8s 11d; monkey nuts, unshelled, 8s 3d to 8s 9d per 100 lbs; oats, per 153 lbs: light and damaged 7s 9d to 8s 11d, heavy and special 10s to 12s 3d; onions, per 123 lbs: dry, Cape, 12s 6d to 14s, fresh and local dry 7s to 12s; potatoes, per 153 lbs: choice and fresh 17s 9d to 21s, good table and seed 16s to 17s, small to medium 13s 6d to 15s 6d; sweet potatoes, 5s to 6s 6d per 153 lbs; pumpkins, 3d to 1s each; rye, sound, O.R.C., 16s 9d to 17s 6d per 203 lbs; salt, coarse, 5s 9d to 6s 6d per 203 lbs; wheat, heavy milling, 21s 9d to 24s per 203 lbs; tobacco, per lb: cut 2d to 5d, roll 2½d to 6d.

KIMBERLEY.

Messrs. James Lawrence & Co., Ltd., Box 301, Kimberley, report as follows relative to the Kimberley market on the 23rd July:—

REMARKS.

Bran: There is every indication of a drop in price. Barley, demand limited. Seed barley enquired for. Chaff (compressed) plentiful. Food chaff enquired for. Forage, prices have firmed slightly. Grass hay plentiful and cheap. Kafir corn, price low; demand limited. Mealies, large quantities are now offering and prices have receded. Oats unchanged. Onions cheap owing to arrival of large quantities. Potatoes, good demand for first-class samples. Butter slightly firmer. Poultry in demand. Eggs realising satisfactory prices. Game in demand. Live stock unaltered.

PRICES OBTAINED.

Live Stock and Animal Produce.—Oxen (good) prime, 600 lbs upwards, £6 10s to £9; cows (good) 450 lbs upwards, £4 10s to £6; calves, 4d per lb dead weight; pigs, 100 lbs (clean), 3d to 3½d per lb live weight; lambs, 30 lbs 6s 6d to 8s 6d; hamels, 40 lbs to 45 lbs, 8s to 12s; Cape sheep (good), 10s to 12s 6d; kapaters (good), 10s to 12s 6d; oxen, trek, £5 to £6 10s; riding horses, £10 to £25; draught horses, £10 to £22 10s;

POLLITZER & CO., BOX 407, DURBAN,—

HENWOOD'S sell BRADLEY'S CULTIVATORS.

mares, £9 to £20; butter, per lb: fresh 1s to 1s 3d, second quality 9d to 11d; eggs, 1s 3d to 1s 6d per dozen; ducks, 2s 6d to 3s each; fowls, 1s 6d to 2s 3d each; turkeys, 3s 6d to 7s 6d each.

Vegetable Produce.—Bran, 7s to 7s 6d per 100 lbs; barley, 10s to 13s 6d per 163 lbs; beans, per 203 lbs: sugar 32s 6d to 37s 6d, Kafir 10s to 12s; chaff (Colonial), 6s 6d to 9s 6d per bale; chaff, pressed, 3s to 4s per 100 lbs; forage, per 100lbs: good 5s 6d to 5s 9d, inferior, 4s 9d to 5s 3d; Kafir corn: S.A. mixed 8s to 9s, white 8s to 9s; Boer meal (Colonial): unsifted 28s to 29s, sifted 30s 6d to 32s 6d; flour (Colonial) 16s 6d to 17s per 100 lb; mealies, per 203 lbs: yellow 9s 6d to 10s 6d, white 9s 6d to 10s 6d; mealie meal, white, 10s 6d to 11s 6d per 183 lbs; oats, 9s 6d to 10s 6d per 150 lbs; lucerne hay, 4s 6d to 5s 3d per 100 lbs; onions, 6s to 10s per 120 lbs; potatoes, per 163 lbs: 14s to 20s, local 16s to 24s; tobacco, per lb: good 4d to 7d, inferior 1d to 2d; wheat, 23s to 26s per 203 lbs; salt, 3s to 4s per bag; lime, 2s 6d to 3s 6d per bag; cabbages, 1s 6d to 5s per dozen; pumpkins, 2s to 6s per dozen; cauliflowers, 2s to 6s per dozen. *Fruit.*—Apples, 2s to 8s 6d per 100; guavas, 1s to 5s 6d per box; oranges, 2s to 4s 6d per 100; naartjes, 1s 6d to 3s 6d per 100; pineapples, 1s to 1s 6d per dozen.

EAST LONDON.

The *E. L. & Border News* reports the following prices realised on the East London market on the 17th July:—

Stock and Animal Produce.—Butter, per lb: first quality 1s 4d to 1s 8d, second quality 1s to 1s 3d; eggs, per dozen: new laid 1s to 1s 6d, traders 10d to 11½d, Penquin 1s; fowls, 1s to 2s 5d each; geese, 3s each; ducks, 2s 1d to 3s 3½d each; guinea fowls, 1s 9d to 2s 7½d each; turkeys, each: cocks 6s to 6s 5d, hens 3s 6d to 4s 6d; pork, 3½d to 5d per lb; beef, 2d to 3d per lb; mutton, 2d to 4½d per lb.

Vegetable Produce.—Beans, 9s per 100 lbs; mealies, yellow German, 6s 6d per 100 lbs; oathay, 2s 6d to 3s per 100 lbs; potatoes, per 100 lbs: best 8s 6d to 12s, second quality 6s to 8s; sweet potatoes, 2s 6d to 3s; turnips, 3d to 5d per dozen; beetroot, 4d to 5d per dozen; cabbage, 4d to 3s 3d per dozen; cauliflowers, 6d to 4s 8d per dozen; pumpkins, 2s to 3s 9d per dozen; carrots, 3d to 9d per dozen; tomatoes, 3d to 3s 2d per box; wood, per load: cut 10s to 25s 6d, uncut 4s to 9s 6d. *Fruit.*—Oranges, 1s to 6s 8d per 100; naartjes, 1s to 3s 1d per 100; guavas, 1s to 3s 1d per box; pineapples, 1s 2d to 1s 4d; apples, 1s to 1s 9d per box; lemons, 6d to 1s per 100.

—BUYERS OF BARK, MEALIES AND OTHER PRODUCE.

HENWOOD'S sell ANYTHING YOU—

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Wool Brokers and Produce Auctioneers.

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FIELD STREET, ESPLANADE, DURBAN.

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Wool, Hides, Bark, etc.

We have compiled the following notes from reports kindly sent in by Messrs. Reid & Acutt's Wool Mart, Ltd., Durban:—

No sale was held in the end of June owing to the limited quantity of produce now arriving. At the auction held at Messrs. Reid & Acutt's Wool Mart during the week ended 2nd July the bulk of the catalogue consisted of oddments which did not offer much attraction to the buyers, but which, nevertheless, met with fair competition and changed hands at full rates. For the few lots offered showing any character, bidding was brisk and the market well maintained.

At their sale in the middle of July the offerings were small, and consisted largely of snow whites. The grease wool shown was generally not of a nature to afford any criterion of the effect of the decline in London on the local market, being mostly heavy and wasty. Coarse and coloured wool was in small demand, competition for this class being very restricted, and prices showed a decline of fully ½d per lb on rates current a month ago.

The July series of London sales opened on the 6th July, on which date Messrs. Reid & Acutt's correspondents cabled as follows:—

SEND YOUR PRODUCE FOR DISPOSAL TO—

HENWOOD'S sell MASSEY HARRIS BINDERS & MOWERS.

COMMODITIES ABROAD.

NEWS OF THE OVERSEA MARKETS.

The Maize Market.

Writing on the 5th June, Messrs. Campbell & Phillips remarked:—"The holidays have interfered with business and at the commencement of the week little was doing. Maize has become cheaper for forward months, the Plate crop prospects being reckoned as very favourable. The total shipments are 446,500 qrs, as against 349,500 last week; of these 18,500 are for London, as against 32,000 last week. For the spot article therefore the price is steady." The following prices were quoted by Messrs. Campbell & Phillips c.i.f. London per quarter of 480 lbs:—

	s.	d.
La Plata, afloat	26	9
La Plata, May	25	7¾
La Plata, June-July	25	6
S.A. Yellow Rd. faq. June-July	25	6

Writing on the 12th June, Messrs. Campbell & Phillips remarked:—"The tendency of this article has been downwards during this week. Good arrivals in London and Liverpool have affected prices, the total shipments for London being 46,000 qrs as against 18,500, Liverpool 32,000 as against *nil* the week before. The total shipments to Europe are about 24,000 qrs in advance of last week. Plate maize is arriving in most excellent condition, but small quantities of South African have met with little support." The following prices were quoted by Messrs. Campbell & Phillips c.i.f. London per quarter of 480 lbs:—

	s.	d.
La Plata, afloat. Rye terms	26	7½
La Plata, June-July. Rye terms	25	6
S.A. Yellow Rd. faq. June-July Govt. terms	26s 6d and 26s 9d	
S.A. White Flat faq. June-July Govt. terms	28	6

Writing on the 19th June, Messrs. Campbell & Phillips remarked:—"The market has been depressed in values owing to the large movements from the West to this country during the majority of the week: the shipments from the Plata are 354,000 qrs as against 469,000 the week before.

POLLITZER & CO., DURBAN, PRODUCE BUYERS.

HENWOOD'S sell MASSEY HARRIS REAPERS & RAKES.

Plata maize still arrives in good condition and buyers are well satisfied." The following prices were quoted by Messrs. Campbell & Phillips c.i.f. London per quarter of 480 lbs:—

	s.	d.
La Plata, afloat. Rye terms	25	10½
La Plata, June-July. Rye terms	25	4½
S.A. Yellow Rd. faq. July-August Govt. terms	26	9
S.A. White Flat faq. July-August Govt. terms	28	1½

Writing on the 26th June, Messrs. Campbell & Phillips remarked:— "The market has improved during the last week in sympathy with the oats market. The shipments from the Plate are fairly liberal: London 55,000 qrs as against 46,000 the week before, the total shipments 457,000 qrs as against 354,000 qrs, which will steady values. A fair inquiry has been apparent with regard to South African qualities well above Plate prices to arrive, but distant shipment is still at a discount." The following prices were quoted by Messrs. Campbell & Phillips c.i.f. London per quarter of 480 lbs:—

	s.	d.
La Plata, afloat. Rye terms	26	3
La Plata, June-July. Rye terms	26	0
S.A. Yellow Rd. faq. July-August. Govt. terms	26s 9d and 28s 10½d	
S.A. White Flat faq. July-August. Govt. terms	28	9

According to *Beerbohm's Evening Corn Trade List,* the position of the oversea maize market, week by week, in June has been as follows:—

During the week ended 4th June, notwithstanding continued large shipments from Argentina, the maize market ruled firm, and prices showed some improvement, partly because of the smaller supplies than expected coming forward from South-Eastern Europe, and partly because of the absence of American corn; 26s 4½d was paid on the 3rd June for a La Plata steamer loading, whilst for June-July shipment 25s 9d was obtainable.

During the following week, the market was fairly active, and prices, after slight fluctuations, closed at about the same level as the previous week, notwithstanding increased shipments from Roumania and a continued record export movement from Argentina for the time of year; for the previous five weeks the shipments averaged 410,000 qrs per week, against 350,000 qrs per week last year.

During the following week, the demand for maize was less active, but prices improved somewhat. The shipments from Argentina were

POLLITZER & CO., BOX 407, DURBAN—

HENWOOD'S sell S.W.P. and OTHER PAINTS.

rather smaller, although still large, *viz.*, 354,000 to Europe, "but the quantity from the Danubian ports is increasing," remarks the *List*, "and the total for Europe will be well up to ordinary needs, as has been the case for the last six weeks," during which the total shipments averaged 575,000 qrs per week.

The general demand for maize showed an improvement at the end of the last week in June, and the prices were 3d to 6d higher on the week. The previous week's shipments to Europe showed a decrease to 45,000 qrs, of which 350,000 qrs came from Argentina; the latter's total for the week under review was 450,000 qrs, so that the European normal requirements continued to be satisfied; the active demand, however, was probably rather above the normal, judging from the firmness of prices. During the week a number of cargoes changed hands: 26s 4½d was paid for cargoes afloat and loading; 26s 3d for June shipment; 26s 1½d for June-July shipment, and 26s 4½d for August-September shipment. European maize was not very freely offered, but a handy steamer of Don-Gal-Fox at Gibraltar realised 27s 3d per 492 lbs. The American exports were *nil*, but the Odessa receipts were more liberal.

In Mark Lane prices were fairly maintained at about 27s 6d to 27s 9d for La Plata landed, 27s 3d for Odessa, and 28s to 29s for South African of fine quality. An active business occurred in parcels of La Plata, May-June shipments being only slightly higher on the week, whilst later shipments advanced 6d per quarter since the last week. In Liverpool also quite a good business was done in La Plata at prices nearly equal to those in London; whilst it was also reported that business in new crop mixed American December shipments from Gulf ports were done at 24s 7½d c.i.f. Liverpool.

Commenting upon the maize crop generally, and upon the prospects of the market, *Beerbohm's* List remarks:

"The crop reports from South-Eastern Europe are now on the whole quite favourable, copious rains having fallen throughout the maize-growing districts. Concerning the Argentina crop, the reports continue to praise the qaulity, but there is an inclination to reduce the estimates as to quantity from their recent very high point. Meanwhile the export movement since the middle of April has been quite a record one, being attracted, naturally, by the high prices obtainable."

STATISTICS.

The general statistical position on the 25th June (according to the *Corn List*) was as follows:—

—BUYERS OF BARK, MEALIES AND OTHER PRODUCE.

HENWOOD'S sell HOWARD'S PLOUGHS & HARROWS.

	1908/9—qrs.	1907/8—qrs.	1906/7—qrs.
On passage to U.K.	900,000	775,000	910,000
„ „ Cont.	1,310,000	1,210,000	1,290,000
Imports into U.K. for the 24 weeks ending June 19	3,973,500	3,529,400	5,334,900
Visible supply in U.S. *(Bradstreet's)* ..	782,900	667,300	1,863,200
American crop	308,000,000	302,000,000	335,000,000
	1909.	1908.	1907.
New York, Spot	65¾c new crop	76½c	63c
Mark Lane, Odessa landed	27/3	—	23/9

SHIPMENTS OF MAIZE TO EUROPE FROM JANUARY 1ST TO DATE.

	1909. U.K.*	1909. Cont.	1908. U.K.*	1908. Cont.	1907. U.K.*	1907. Cont.
	Qrs.	Qrs.	Qrs.	Qrs.	Qrs.	Qrs.
America	1,237,000	1,016,000	1,052,000	1,281,000	2,588,000	2,810,000
Argentine	1,949,000	1,532,000	1,545,000	1,426,000	944,000	638,000
Russia	395,000	875,000	366,000	599,000	849,000	1,135,000
Danube, etc. ...	1,009,000	1,096,000	912,000	1,374,000	1,064,000	1,662,000
Total ...	4,590,000	4,520,000	3,875,000	4,680,000	5,445,000	6,245,000

* Includes shipments for orders

Miscellaneous Commodities.

We are indebted to Messrs. Figgis & Co.'s *Monthly Price Current*, of East India, Cape of Good Hope, China and Singapore produce, of the 17th June, for the following notes on such commodities as are likely to interest our readers:—

Aloes (Cape).—62 packages offered, 53 sold at full prices. Mossel Bay—Good hard bright 32s 6d to 33s, part dull and drossy and soft 30s to 31s 6d, very coarse dull 28s 6d, mixed with dirt 26s.

Beeswax (East Indian).—Quiet. 86 packages offered, 8 sold at £6 5s. (Mosambique).—45 packages sold: Rolls, mixed colours £7 to £7 5s, remelted grey and yellow £6 12s 6d.

Camphor.—Rather lower, and sellers of China at 137s 6d c.i.f. and 140s on the spot, but very little done.

Chillies.—Quiet. Buyers Mombasa 35s c.i.f. New York.

Ginger.—Firm. At auction, fair washed Cochin 40s.

Indigo.—At the second quarterly auctions of the year, held 19th May, 500 chests were offered, but with slow demand only 100 sold. Good Bengals realised barely last sales rates, and middling grades cheaper and difficult of sale.

SEND YOUR PRODUCE FOR DISPOSAL TO—

HENWOOD'S sell THE "PUMP" SEPARATOR.

Ostrich Feathers.—The quantity offered at auction 31st May was again very large, the weight being 99,500lbs, against 102,500lbs in April, and 88,100lbs in June last year. The quality of the feathers was unusually good, in fact there has never been a better show. There was a very active demand throughout, especially from America, and all broken Wings and narrow (which have been so cheap) sold at much better prices, also Spadones and medium Blacks. Best Wings, in spite of the quantity, sold at nearly last sales, rates, while Boos sold badly, but they were mostly common quality. Considering the enormous supplies the results of the sales must be considered very satisfactory. Whites.—Finest were in large supply and barely maintained last sales' rates, but seconds and thirds were 10 per cent. dearer. Feminas.— Best long were weak, but seconds and thirds advanced 10 to 15 per cent., narrow and broken often more. Byocks were 7½ per cent. dearer, especially the medium sizes. Spadones were in much smaller supply, and fully recovered the fall of last sale, advancing from 10 to 20 per cent. Boos.—White and Femina much cheaper, except a few good lots, and declined fully 15 per cent., but Drab sold firmly. Blacks were in good demand. Good long sold about last sales' rates, but medium and medium and short were fully 10 per cent. dearer. Drabs.—Long advanced 10 per cent., and other kinds showed little change. Floss again sold at easy prices, but short was firmer. 4,783 cases (including 219 cases of Egyptian feathers, which were partly sold) were catalogued for these auctions and mostly sold. Value sold, about £242,000. Next auctions July 26th.

Vanilloes.—At auction 19th May.—In good demand at a general advance of 1s to 1s 6d per lb. 370 packages offered, 315 sold. Seychelles, 8 to 8½ inch 13s 6d, 7½ to 8 inch 12s to 13s, 7 to 7½ inch 11s, 7 inch 10s 6d, 6½ to 7 inch 9s 9d to 10s 6d, 6½ inch 10s 6d to 11s, 6 to 6½ inch 9s to 10s 6d, 5½ to 6 inch 9s to 9s 6d, 5 to 5½ inch 8s 9d, 5 inch 10s, 4½ to 5 inch 8s 6d to 8s 9d, 4 to 4½ inch 8s 3d, 3½ to 4 inch 8s 3d; II and III 7s 3d to 9s, foxy split 7s 9d to 8s 6d. Madagascar, 7 inch 10s 6d, 6½ to 7 inch 10s 9d, 6½ inch 10s 6d, 6 to 6½ inch 10s 6d, 4½ to 5 inch 8s 6d, II and III 8s 3d to 8s 9d, foxy split 8s 3d to 8s 6d. Mauritius, 8 to 9 inch 16s, 8 to 8½ inch 15s, 7½ inch 12s to 12s 6d, 7 to 7½ inch 11s 6d to 13s, 7 inch 10s 6d to 12s, 6½ to 7 inch 10s to 11s 6d, 6½ inch 9s 9d to 11s, 6 to 6½ inch 9s 3d to 10s 6d, 6 inch 9s 3d to 10s, 5½ to 6 inch 8s 6d to 10s, 5½ inch 8s 9d to 9s 9d, 5 to 5½ inch 8s 9d to 9s 9d, 4½ to 5 inch 8s 3d to 9s 3d, II and III 7s 9d to 9s 6d, foxy split 8s 3d to 8s 9d. Tahiti. —Mexican, 7½ to 8½ inch 9s 6d, 4½ to 8 inch 8s 3d, 6 to 7½ inch 8s 6d. Next sales 23rd inst.

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AGRICULTURAL CONDITIONS IN JUNE.

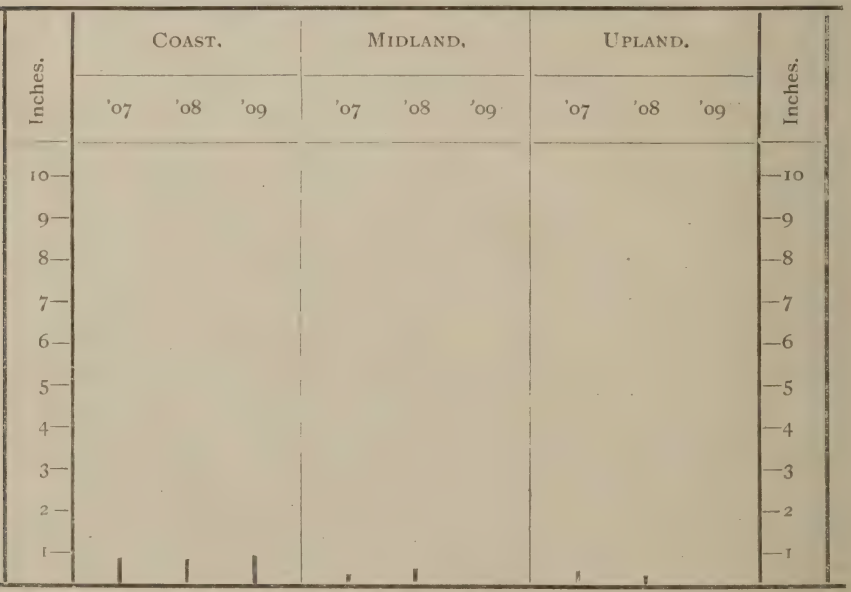
The Weather, Crops and Live Stock.

In our last issue we remarked upon the irregular manner in which our correspondents were sending in their monthly reports; we are now, however, pleased to be able to state that a greater number are being received. Our correspondents are, no doubt, conscious of the fact that it is essential that they should send in their returns regularly if our report is to be of any value.

The rainfall during the month under review has been extremely slight, most of the districts reporting "insufficient" and "none." A reference to the usual diagram, which we publish herewith, will show that less rain fell during June of this year than during the corresponding month of the two preceding years. According to the reports frosts have been very light during the month, a number of districts reporting not

THE WEATHER IN JUNE.

Diagram Showing Rainfall in June during the last Three Years.



NOTE.—The above diagram is based upon the average rainfall during the month.

POLLITZER & CO., DUBBAN, PRODUCE BUYERS.

HENWOOD'S sell THE CELEBRATED B.Z. PLOUGH.

having seen any, which is very unusual for June; practically no damage has been caused.

The condition of the mealie crop is referred to in our leader in the *Journal* itself. It will be seen that there was an improvement in condition at the end of June as compared with previous months. Our estimate of the crop now stands at 800,000 muids. There is nothing fresh to report with regard to mabele, wattle bark and potato crops, the two former of which continue to be reported good, while the potato crop is rather poor. Citrus fruits are reported good and in some districts are very heavy. Prices of eggs and poultry, milk and butter have, in most districts, improved. The live stock market still remains the same.

COMMERCIAL INTELLIGENCE BUREAU.

Facilities for Producers and Exporters.

IN view of the considerable number of enquiries which are made by various commercial firms and private individuals in the United Kingdom, on the Continent of Europe, and elsewhere, with regard to the export of Natal produce and in connection with other matters of interest to Natal farmers and producers generally, the Department of Agriculture has instituted a Commercial Intelligence Bureau for the purpose of putting producers and buyers in touch with each other and generally of furthering the commercial relations of the Colony with other parts of the world. Besides British and Continental commercial houses wishing to get in touch with Natal producers and merchants, there are doubtless many farmers, merchants and others in Natal who would be glad of the opportunity of getting into touch with buyers oversea, and it is to help these also that the Commercial Intelligence Bureau has been instituted.

The Bureau is under the charge of the Editor of the *Natal Agricultural Journal,* who keeps records of (*a*) British and Continental firms desirous of getting into touch with firms and producers in Natal, (*b*) firms and producers in Natal who wish to be put into touch with buyers, brokers and manufacturers in the United Kingdom and elsewhere, and (*c*) growers producing in sufficient quantity for export. He works in conjunction with the Commercial Agent for Natal in London, who furnishes him with the names of firms in the United Kingdom and Europe and gives publicity in England to lists furnished him by the Editor of the *Agricultural Journal;* the Editor, in turn, publishing lists based upon the information sent to him by the Commercial Agent.

POLLITZER & CO., DURBAN, PRODUCE BUYERS.

HENWOOD'S sell CULTIVATORS & N.A. PLOUGHS.

The attention of all who have an interest in oversea trade relations is accordingly directed to the Commercial Intelligence Bureau, and those who wish to get into touch with British and Continental firms should send full particulars of their requirements—what they wish to export, what commodity or commodities they wish to trade in, and so on—to the Editor of the *Journal,* who will transmit their names to the Commercial Agent (who will publish notices in various English papers), as well as give publicity in the *Agricultural Journal* (which has a considerable circulation abroad) to their requirements.

Growers producing sufficient quantities of various commodities for export are also requested to communicate with the Editor, who may be instrumental in placing them in communication with buyers in England and elsewhere.

Correspondents will be interested to hear that the Manager of the Commercial Intelligence Bureau, Ltd., of 57 and 58, Holborn Viaduct, London, E.C., has very kindly consented to insert our South African notices in the pages of the journal, *Trade Openings,* of the Bureau. This will naturally secure for them a still wider circulation in the United Kingdom than they have hitherto enjoyed.

OVERSEA FIRMS.

The following is a list of firms, particulars of which have been received from the Commercial Agent. In each case the Editor will be prepared to supply the name and address of the firm, upon request, together with all details which he has received. It must be distinctly understood, however, that the Department of Agriculture accepts no responsibility in regard to the standing of these firms:—

O 1. A firm in Hamburg wish to get into touch with houses in Natal exporting mealies and wattle bark. Full particulars of the terms and arrangements upon which they are prepared to do business can be furnished.

O 2. A London firm of corn brokers desire to get into communication with Natal exporters of maize.

O 3. A firm of Indian and African merchants, in London, wish to get into communication with firms in Natal who are requiring agents in England to handle and sell their products, *viz.*, hides, skins, tallow, hair, hoofs, bones of all kinds, oilseeds, tea, etc.

O 4. A London firm wish to get into touch with producers in Natal, chiefly of fruit.

O 5. A firm handling the new patent Duchemin fibre machines (see March *Journal,* page 259) in London desire to appoint an agent in Natal, and also to get into touch with fibre planters.

O 6. A firm in Sangerhausen (Germany), who are manufacturers of beet and cane sugar machinery, desire to enlarge their business relations with Natal and are wishful of appointing agents in the Colony.

O 7. A firm of importers of grain in Paris are anxious to do business in Natal maize, and seek offers of such maize, c.i.f. French ports.

O 8. A firm at Swansea, importers of gold and silver concentrates, copper, lead, zinc and antimony ores, also calamine, wish to get into touch with exporters of such concentrates and ores from Natal.

POLLITZER & CO., DURBAN, PRODUCE BUYERS.

HENWOOD'S sell SEAMLESS MILKCANS.

O 9. A firm at Brigg, Lancashire, who are manufacturers of table delicacies, desire to be put into communication with suitable houses of good standing in the Colony.

O 10. A well-known importing and exporting firm in London wish to get into communication with firms desiring representation in London, or to get in touch with growers of maize and other produce.

O 11. A firm in Scotland, manufacturing leather tyres, desires to get into touch with buyers in Natal.

O 12. A London firm wishes to get into communication with buyers in Natal of enamelware, bentwood chairs, glassware, wire nails, glazed tiles, picture mouldings, and pictures.

O 13. A firm manufacturing gas plants, gas engines, &c., are desirous of extending their business in Natal. They state that they find that Natal Anthracite is very suitable for their suction and other types of gas plants, and that the ordinary bituminous coal is suitable for a certain type of plant manufactured by them.

O 14. A Liverpool buying and commission agent and general merchant, wishes to extend his business in Natal.

O 15. A London firm of Indian and African merchants wish to enter into business relations with Natal for the marketing of such produce as hides, skins, horns, wool, hair, mica, minerals, hemp, fibre, grasses, rubber, gum, wild cotton, coffee beans, bark, cocoa beans, vegetable ivory, oil seeds, palm kernels, spices, wax, raw silk, &c.

O 16. A Birmingham firm of carriage builders desires to be put in touch with buyers in Natal.

O 17. A correspondent in India asks to be placed in communication with exporters of oats. He may require large quantities, and, if rates are favourable, he could possibly take consignments of one hundred tons monthly.

O 18. A Paris correspondent desires to be put into touch with merchants or producers in Natal for the sale of instruments for the distillation of spirits and alcohol.

O. 19. An Electrical Engineering Institute in London desires to secure an agent in Pietermaritzburg to act as representative for the Institute for Natal.

O 20. A firm in Leeds, England, is desirous of finding a market in Natal for old (used) empty Champagne and other bottles.

O 21. Milling Engineers, Leeds, England, are willing to submit specifications for machinery for grinding maize for domestic purposes, and also for flour milling machinery.

O 22. West of England firm (who have exceptional facilities for shipping), manufacturing Acid Proof and Fire-resisting Bricks and Blocks, ask to be put in touch with Natal importers.

O 23. A leading Australian manufacturer of Disc Ploughs and Cultivators requires reliable agent for Natal. He would be pleased to get into communication with producers and others.

O 24. A London firm is desirous of appointing a reliable firm as agent for their Toilet Preparation, viz. :—Calchora Bath Sachets.

O. 25. An engineering firm at Keighley (England), manufacturing domestic and laundry machinery and cooking apparatus on a large scale, desire to get in touch with merchants in Natal requiring machinery of this description.

SOUTH AFRICAN PRODUCERS AND MERCHANTS.

Particulars have been received from South African producers and merchants as follows:—

A 1. A produce and manufacturers' agent in Durban is desirous of extending his business to English and Continental firms who may require an agent for Natal Produce. He is fully acquainted with all branches of the business, shipping, finance, etc., and has an extensive list of clients on the Coast who are anxious to ship mealies, etc., abroad.

A 2. A correspondent near Maritzburg, who is interested in iron and copper production, wishes to get in touch with firms in Great Britain for the purpose of further exploiting his iron and copper works, which are now lying idle for want of capital. Details on application.

A 4. A correspondent desires to obtain the name and address of a manufacturer of tobacco-cutting machines in England, Germany, or the United States.

N.B.—Correspondents are requested to quote letter and number when referring to any of the foregoing notices.

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The Journal is issued on the last Friday of every month.

Literary Communications to be addressed to the Editor, "Agricultural Journal," Department of Agriculture, Maritzburg.

Matter for advertisements or alterations in standing advertisements must be sent to the Publishers not later than the 18th of the month

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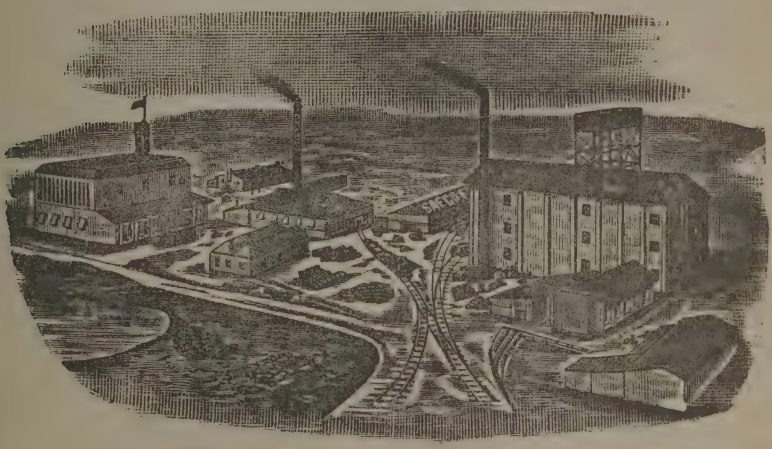
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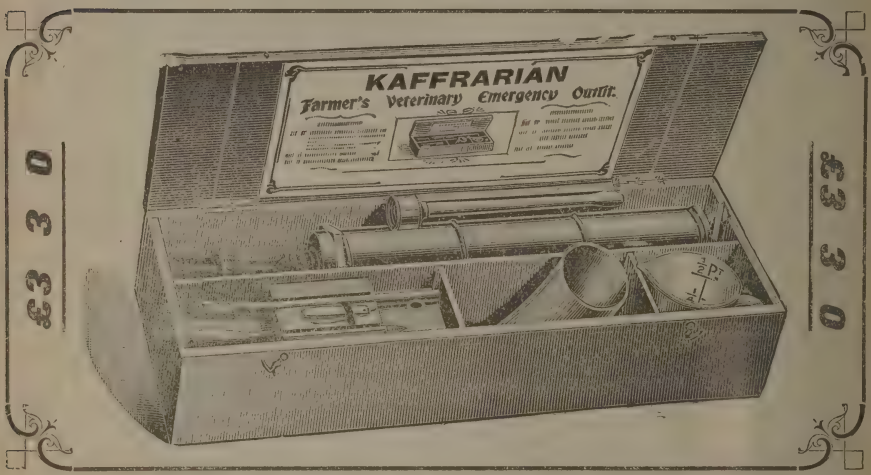
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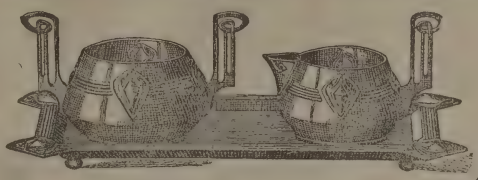
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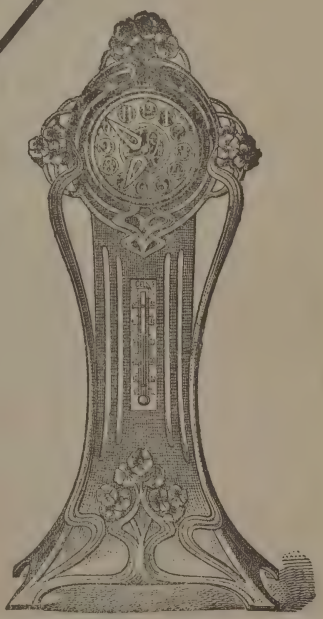
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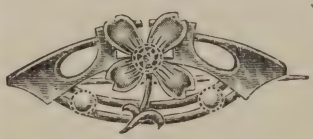
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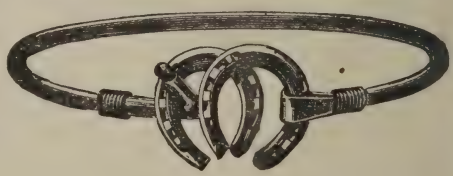
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*** "*The Markets and Crops*," *issued as a supplement with each number of the* Journal, *contains full information regarding South African and oversea markets and crop conditions, and Commercial Intelligence Bureau announcements.*



THE GOVERNMENT EXPERIMENT STATIONS' EXHIBIT AT THE ROYAL AGRICULTURAL SHOW, MARITZBURG.

Vol. XIII., No. 1. JULY 30th, 1909.

The Natal Agricultural Journal.

The Final Maize Estimate.

We have now reached the end of the season for maize. The crop has been harvested, and quite an appreciable portion of it has already been exported. We are accordingly now in a position to publish a final estimate of the crop, based upon data received from our correspondents all over the country. During the past six months we have published, as a "sub-leader," a monthly revision of our first estimate of the probable crop according to conditions prevailing at the end of December; and we think that the final estimate which we are about to give reflects the position as fairly as can be expected under present circumstances. It is our ambition to make our estimates more and more reliable each year, and consequently with each season we hope to introduce fresh improvements into our methods of collection of data and calculation therefrom as well as to enlarge the circle of our correspondents. In this connection we may mention that we shall be glad to hear at any time from gentlemen who would be prepared to help us next season, to whom we shall be pleased to send particulars as to what the filling in of the forms for us really involves. We would also here take the opportunity of thanking all who have so very kindly helped us during the season which has just closed, for their ready assistance in filling in and posting us the schedules supplied to them—which service has been done regularly without any break by practically every correspondent.

Last month we had to report a diminution of the crop by about 20,000 muids, bringing our estimate down to 750,000 muids. We are pleased to be able to state now that the crop picked up well in May, so that we can now add 50,000 muids to our last revision, bringing it up to 800,000 muids. The condition of the crop at the end of June was 2·82

(that is to say, not far from an average crop), representing a probable yield of 4·86 muids to the acre. The probable yield at the end of May, it may be remembered, was 4·54 muids to the acre, based upon a general condition of 2·64.

In order that the progress or otherwise made by the crop each month may be properly appreciated, we give below two statements, one showing the condition of the crop each month in each of the Magisterial Divisions of the Colony, and the other showing the average condition of the crop, the yield per acre that condition represents, and the total crop promised thereby, at the end of each of the months, December—June. As usual, the figures 1, 2, 3 and 4 are used to represent the conditions "Poor," "Fair," "Average," and "Above the Average," intermediate figures (decimals) representing intermediate states.

The first statement shows the progress or otherwise the crop has made in each of the Magisterial Divisions of the Colony:—

CONDITION OF CROP.

(Note.—A condition "above the average" is represented by the figure 4; "average" by the figure 3; "fair" by the figure 2; and "poor" by the figure 1: intermediate figures represent corresponding conditions.)

Division.	Condition of Crop at End of:—						
	Dec.	Jan.	Feb.	Mar.	April.	May.	June.
Lower Umzimkulu ...	2·7	3·0	2·7	2·5	2·5	2·0	2·0
Alexandra ...	2·5	4·0	4·0	3·0	3·0	2·0	3·0
Umlazi	3·0	3·0	3·0	2·5	2·0	2·5	2·0
Inanda & Indwedwe ...	3·0	4·0	3·0	2·0	3·0	3·0	2·0
Lr. Tugela & Mapumulo	2·0	4·0	3·0	2·0	3·0	2·0	2·0
Impendhle ...	3·0	3·0	3·0	3·0	3·0	2·0	4·0
Alfred	3·0	4·0	3·4	4·0	3·0	4·0	4·0
Ixopo	2·4	4·25	3·5	3·0	2·75	3·0	3·4
Richmond ...	2·5	3·0	3·0	2·5	2·0	3·0	3·0
Umgeni	3·0	3·5	4·0	3·2	3·4	3·5	3·4
New Hanover ...	2·0	2·75	2·4	3·0	3·0	3·4	3·0
Lion's River ...	3·0	3·0	2·5	3·0	3·0	2·5	3·0
Umvoti	3·7	3·2	3·2	3·5	3·4	3·0	3·4
Krantzkop ...	3·0	2·0	4·0	3·0	3·0	3·0	3·0
Underberg ...	4·0	3·0	2·4	2·5	3·0	3·0	3·0
Polela	3·0	4·0	4·0	4·0	4·0	4·0	4·0
Bergville	3·0	2·7	2·0	2·4	2·4	2·4	2·4
Estcourt	2·7	2·9	2·5	2·0	2·7	2·4	2·7
Weenen	3·0	2·0	2·0	2·0	2·0	2·0	3·0
Klip River ...	2·8	2·6	2·75	2·4	2·0	1·7	2·0
Umsinga	2·0	2·5	3·0	2·5	2·0	3·0	2·5
Dundee	2·0	1·7	2·0	2·0	2·0	2·0	2·0
Newcastle ...	3·0	2·9	2·8	2·3	2·3	1·5	2·0
Vryheid & Ngotshe ...	2·5	2·0	3·0	1·0	1·0	1·0	2·0
Utrecht	—	4·0	3·0	2·0	3·0	2·0	2·0
Babanango ...	—	—	—	2·0	1·0	2·0	2·0
Eshowe & Mtunzini ...	3·0	2·5	3·0	4·0	2·0	2·5	3·0
Emtonjaneni ...	2·0	3·4	3·4	3·0	3·0	2·0	4·0

The second statement shows the average condition of the crop (for the whole Colony), the yield per acre promised and total crop:—

At End of—	Condition.	Yield per acre. Muids.	Probable total crop. Muids.
December ...	2·7	4·7	780,000
January ...	3·1	5·34	886,000
February ...	3·0	5·16	856,000
March ...	2·69	4·63	770,000
April	2·7	4·65	770,000
May	2 64	4·54	750,000
June	2·82	4·86	800,000

In our May issue we referred to the question of the surplus available for export from this season's crop. To arrive at anything like a tolerably accurate idea of the exportable surplus we must know (*a*) the probable extent of the Natives' and Indians' crops, and (*b*) the farm consumption of the Europeans' crop. In connection with the former of these two considerations we may repeat what we said in May on the subject:—

"Whilst we have not been able to institute any really systematic inquiries as regards the extent of the Natives' crops this year," we remarked, "it is admitted on all sides—and the reports that we have received confirm the opinion—that the crop will be larger than usual this year. Whilst many reports state that the Natives will be able to sell to a considerable extent this year, we prefer to be conservative and reckon on the fact that the Natives will at the least be able to support themselves this year. We have made careful calculations, and we think we can safely say that the Natives' and Indians' crops (the latter, of course, is a comparatively small crop) together will amount to about 900,000 muids."

This practical certainty that, on the whole, the Natives will be able to support themselves this year enables us to consider the European crop without any further reference to the Natives' requirements. The European crop, we have estimated, is probably something like 800,000 muids in extent this season. The consumption of the European crop in the Colony will probably be something like 400,000 muids. We shall thus have an exportable surplus of about 400,000 muids this year—that is to say, for consumption not only to oversea ports but to other parts of South Africa as well.

Before we close we would like to refer to the losses which are occurring this year through grain being sent down to the port in a damp condition. Considerable quantities have been rejected by the Government Grader as unfit for export, and as a result there have been heavy losses owing to there not being sufficient facilities for the drying of the grain. To endeavour to place the blame would be idle; those who are to

blame have suffered sufficiently to require no injunction to "Be careful in future"; but the least that can be said is that it is most regrettable that so much absolute waste should have occurred simply through what appears to have been downright carelessness. What other result but rejection by the Government Grader could be expected in sending down damp mealies to the port we cannot think, but whatever chances may have been taken by those responsible, there has been no doubt about the disillusionment. We sympathise with those who have suffered, but it is to be hoped that this year's experience will not be repeated.

"Phalaris Commutata."

OPINIONS as to the value of the new winter grass, so-called *"Phalaris commutata,"* vary, and vary widely. While one section of those who have tried the grass are enthusiastic regarding it, another section are disgusted at the results they have had. Mysterious though this difference of opinion appears on the face of it, its explanation is simple, as we hope to show in the course of the present article.

There is not the slightest doubt that there are farmers who have had fine results from their trial of this grass; whilst on the other hand it is equally true that a number of farmers have had disappointing results. Reduced to plain terms, whilst the former find the grass a perennial as claimed for it, the latter dispute its claim to be a perennial, as they find they have to plant afresh each year.

We had a chat on the subject recently with Mr. Geo. Carter, of the well-known firm of Messrs. Carter & Co., who have been doing a great deal in the direction of introducing this grass into the Colony; and he explained to us that the reason of the difference of opinion to which we have referred is that, whilst those farmers who obtained, directly or indirectly, Australian seed have found the grass everything that is claimed for it, others, who purchased *Phalaris commutata* seed from Europe, have found that this European seed does not produce a perennial plant but only an annual. While Mr. Carter was with us we turned up an article on "Toowoomba Canary Grass: the so-called *'Phalaris commutata'*," which appeared in the December, 1908, issue of the *Journal* of the Victorian Department of Agriculture, and there we found an explanation of the matter, which makes the whole thing clear so far as the practical farmer

is concerned. It appears that seeds of about 60 different grasses were received over twenty years ago by the Curator of the Botanic Gardens, Toowoomba, Queensland, from the United States Department of Agriculture. All the other varieties were lost except one, which persisted in out-of-the-way places, such as hedgerows, etc., until four or five years ago it was noticed again and its propagation systematically undertaken. It was at first identified as *Phalaris commutata*—in fact, this was the name of the seed imported 20 years ago. The real *Phalaris commutata,* however, is an annual, while this Australian-acclimatised grass was found to be a perennial. Elsewhere in this issue we reproduce in full the article in question from the *Journal* of the Victorian Department of Agriculture, which apparently gives all that is known on the subject of the strange change which has come over the European *P. commutata* under Australian conditions. It will be seen that the real specific name of the perennial grass is not known with certainty, but it is agreed that it is not strictly speaking *commutata,* and accordingly we shall no longer be justified in speaking of the grass as *"Phalaris commutata."* Perhaps if we adopt the Australian popular name—"Toowoomba Canary Grass"—we shall be on the safe side and avoid confusion; or we should not be wrong in speaking of it as "Phalaris" pure and simple, although the other name is perhaps better.

Obviously, it is our duty to warn farmers against buying *Phalaris commutata* seed from Europe, and we would further advise them to make quite sure, when buying so-called *"Phalaris commutata"* seed from South African dealers, that the seed has been imported from Australia (or obtained from locally grown *Phalaris* of the proper *perennial* variety) and not from Europe or America. Furthermore, those who may wish to import from Australia for themselves are advised to ask for "Toowoomba Canary Grass—perennial *'Phalaris commutata.'*"

The following have been recently appointed stock inspectors: Mr. L. T. Trenor, Mr. John Swales, Mr. A. J. Tanner (assistant for Klip River Division), Mr. J. M. de Lange (assistant for Utrecht Division), Mr. H. B. Chandler (temporarily, for Zululand), Mr. C. Watson (assistant for Newcastle Division), and Mr. C. J. van Rooyen (assistant for Umvoti and Krantzkop Divisions). Mr. S. H. Halahan has been appointed an Inspector of Sheep or Sheep Dipping Officer at Union Bridge, *vice* Mr. B. R. Howes, under Law No. 48, 1887.



Monthly Notes on Bee-Keeping.

THOSE of our readers who are interested in bee-keeping will doubtless be glad to learn that the *Natal Agricultural Journal* has, together with the *South African Poultry Journal*, been chosen by the Natal Bee-Keepers' Association as the official organ of the Association, as a result of which they will be kept up to date concerning the doings of the Association as well as regards most matters of interest to bee-keepers generally. In the present issue of the *Journal* will be found the first instalment of monthly notes, by Mr. W. Mitchell, the Apiculturist at Cedara; and we would also draw the attention of beginners in apiculture to the interesting and useful article on the subject which Mr Mitchell has also contributed. There is a large market in South Africa for honey, and it is to be hoped that the Natal Bee-Keepers' Association will meet with the success it deserves in its efforts to stimulate practical interest in apiculture in this country. We hope to be in a position to publish shortly a series of practical articles on apiculture, by an acknowledged authority on the subject. Negotiations to this end are now in progress.

Revised Duties on Sugar.

The following regulation has been made by His Excellency the Governor in Council, under the provisions of Section 20 of Act No. 9, 1906, in substitution for Government Notice No. 215, 1909, and in addition to the Regulations provided for by Government Notice No. 314, 1907:—A special duty has been fixed provisionally for the following countries at the undermentioned rates: Brazil, per 100 lbs.: raw sugar, 12s. 11d.; refined sugars, 12s. 6d. Mexico, per 100 lbs.: raw sugar, 1s. 1d.; refined sugars, 1s. 1d. Spain, per 100 lbs.: raw sugar, 7s. 11d.; refined sugars, 7s. 11d. Costa Rica: white sugars, 7s. 4d. per 100 lbs.; refined, 5s. 4d. per 100 lbs.; unrefined, 5s. 5½d. per 100 lbs. The Regulations of Government Notice No. 314, 1907, so far as it relates to the provisional duty on sugar from Spain is, therefore, amended as above.

Land and Agricultural Loan Fund.

The attention of those desirous of borrowing from the Fund is called to the fact that the office fees payable on application have been reduced to a uniform sum of 10s., irrespective of the amount applied for. Formerly the fees ranged from £1 to £4, according to the sum which the applicant desired to borrow. We understand that so far about 150 applications for loans have been accepted, totalling approximately £85,000.

Importation of Animals from India and Mauritius.

In view of the fact that the disease, "surra," exists in Mauritius and is endemic in certain parts of India, it has been deemed expedient to prohibit the importation of all animals from those countries, and accordingly a Proclamation (No. 53, 1909), has been issued embodying this prohibition. The Proclamation, which is made under the provisions of Law No. 13 of 1886 and the Animals Diseases Act of 1894, fixes the penalty for contravention of this prohibition at a fine for every animal imported not exceeding £50 with the alternative of imprisonment, with or without hard labour, until the payment of such fine, such imprisonment not to exceed the term of three months.

Maize Export Regulations.

The following addition to Section XVII. of the Port and Harbour Regulations has been approved by His Excellency the Governor in Council:—Rule 272*a*.—No goods intended for export should be offloaded within Harbour jurisdiction until the Wharf authorities have been furnished with full written particulars thereof, and are satisfied that the storage accommodation required is reasonable, and that the loading steamer named in the said writing is the first available steamer for shipment. The applicant for this accommodation shall in every case be the party held liable by the Department for any rent that may accrue. Failing the goods being shipped in accordance with the said written advice or of other subsequent advice satisfactory to the Department, rent will be charged in terms of Rule 270. In cases where the parties concerned fail, neglect, or refuse to satisfy the Wharf authorities regarding the storage accommodation required, rent will be charged in terms of Rule 270. Rule 272*b*.—Maize deposited in the Wharf sheds found to be wet or weevily must be at once removed by the owner or his agent. Failing a prompt removal being effected, it will be competent for the Wharf authorities to take the required action at the risk and expense of the goods. Rule 272*c*.—The Official Grader will not issue a grade certificate for any consignment of maize until it is actually being shipped, but he will, if requested at any time prior to the shipment, examine and verbally advise on any consignment.

Rates on Citrus Fruits.

We have been advised by the General Manager of Railways that, with effect from July 1st, 1909, the rates appearing in Clause 60, page 38 of Goods Tariff Book No. 22 for fruit exported oversea beyond South Africa will only apply to fruit consigned through the Government Grader. Fruit not so consigned will be charged at the S.A.P. "B" rate.

Introduction of Equines into Natal.

In connection with Proclamations Nos. 28, 1908, and 36, 1909, prohibiting the introduction of equines from the Transvaal, Orange River Colony and Cape Colony into Natal except by written permission of the Principal Veterinary Surgeon of Natal (which was only to be given subject to the animals having been submitted to the Mallein test), a further Proclamation (No. 50, 1909), has now been issued ordering that the Mallein test prescribed must in every case be conducted by a qualified veterinary surgeon approved by the Natal Principal Veterinary Surgeon.

Hlatikulu Forest.

In terms of Regulation No. 2 (*a*) made under Ordinance No. 4 of 1853, and published under Proclamation No. 58, 1903, the undermentioned Crown Forest, known as the Hlatikulu Forest, having been surveyed, has been declared to be a demarcated forest within the meaning of the Regulations. Plan of this forest is now lying in the office of the Director of the Division of Agriculture and Forestry. The forest is bounded north-westwards by the Drakensberg Location No. 1, northwards by "Forest Lodge No. 2," eastwards by "Forest Lodge," and southwards by "Mazwe."

Revision of Local Goods Rates, N.G.R.

The General Manager of Railways announces that, with effect from the 1st August, 1909, the following articles will be re-classified in local bookings between N.G.R. stations, *viz.*:—Cases in tubes, from "normal" to "inter. B"; bottles and jars, common glass, at owner's risk, from "inter. B" to "rough"; tin, in sheets, to be used in manufacturing tinware, from "inter." to "rough"; cardboard, millboard, and strawboard, from "inter." to "rough"; angle, channel, T, bar, and rod iron, from "inter." to "inter. B"; seeds (imported) for agricultural purposes, from "normal" and "inter." to "rough"; iron (galvanised), in 10-ton lots (undamageable), from "inter. B" to "rough"; gutters and guttering (undamageable), from "normal" to "inter."; S.A. barley, beans, bran, buckwheat, chaff, fodder, forage, grain, e.o.h.p., hay, Kafir corn, lucerne, maize, millet, oats, oathay, onions, potatoes (including sweet potatoes), seeds, straw, sugar cane for cattle feeding (small lots), vegetables (fresh or dried), from S.A.P. "B" to S.A.P. "C."



Photo. by] *[J. J. Stephenson.*

TRANSPORT EXHIBITS AT THE "ROYAL" SHOW.—I.

Complete Transport Turnout—Natal Transport Department's Entry.

Railway Rate on Kafir Corn.

Readers will doubtless be interested to hear that South African Kafir corn for export oversea beyond South Africa is now being conveyed on the Natal Government Railways at the same rates and under the same conditions as South African maize so exported, both in local and through traffic.

Notifiable Diseases.

The Chief of the Veterinary Division of the Department of Agriculture has published a reminder that the diseases Redwater and Gall-sickness are contagious or infectious diseases within the meaning of Act No. 38, 1904, and that all deaths from these diseases should be reported to the District Veterinary Officer or Stock Inspector of the Division. Under Section 4 of the Act, any person who has in possession or charge any animal showing symptoms of these diseases is supposed to isolate the animal immediately and at once give notice to the owners or occupiers of adjoining properties and to the Magistrate of the Division.

Manufacturing Lemon Oil.

In a recent report the United States Consul at Messina refers to the lemon oil manufacturing industry of Sicily, and gives some interesting particulars of the method in vogue there in the manufacture of the oil. In order to prepare the essential oil, he states, the peels are first soaked in water for some four or five minutes for the purpose of softening the envelopes of the oil vesicles, and rendering easier the expression of the oil. The peels are then carried to the expressing room, which is usually darkened, and kept as cool as possible, to guard against any changes in the character of the delicate and unstable oil. In the expressing room each workman is seated on a low stool, and has before him a glazed earthenware bowl, across which, and resting in depressions in the rim, is a wooden rod run through a good-sized sponge. In his left hand the workman holds another sponge, often cup-shaped, against which he presses the outside of the peel, giving this a circular twisting motion. By this means the walls of the oil cells are broken, and the oil is squeezed out into the sponge to drip into the bowl. In this the oil rises to the top of the water, and can be decanted off. The oil is filtered into large copper containers, in which it is stored to await sale. Various machines have been tried for expressing the oil but so far without success. The amount of oil obtained will vary largely according to the district and the season, but will average from 0·7 lb. per 1,000 lemon peels to 1 lb., and, in rare cases, to as much as 1½ lb.

Lungsickness in Lower Umzimkulu Division.

Lungsickness having broken out in the Lower Umzimkulu Division, the farm "Perbeck" in that Division has been proclaimed an infected area under the Lungsickness Prevention Act of 1897, thereby rendering unlawful the removal of any cattle from that area, whether the same are or are not infected with lungsickness. Any person contravening this Proclamation is liable in respect of every such offence to a fine not exceeding £20 sterling, or, in default of payment, to imprisonment, with or without hard labour, for a period not exceeding three months.

Phosphates at Tweedie.

On the 20th instant an interesting announcement appeared in the *Natal Witness* to the effect that a promising discovery of phosphates had been made on Mr. F. W. Player's farm, "Valhalla," near Tweedie Station, and it was stated that some of the "float" stone recently taken from this property had proved to contain as much as fifty per cent. of pure phosphate. Samples of the newly-discovered stone have been declared by the Commissioner of Mines, after rough tests, to contain phosphate of fairly high grade; and Mr. Gray considers that, if the mineral occurs in quantity, it is worthy of further attention. Since the examination of these samples Mr. Player put in a cross-cut, six feet in depth, and has struck a rich "leader" about a foot wide, dipping at an angle of 45 degrees. Mr. Player's farm lies immediately north-east of the railway at Tweedie Station, and is bounded on its upper side by the Umgeni Heights; it is bisected by the road between Howick Village and Tweedie Station. Mr. Player is to be congratulated upon what appears to be a valuable discovery, and we trust his efforts to exploit his "find" will prove a success.

Introduction of Transport into Cape Colony.

A Proclamation has been issued by the Cape Government notifying that, from and after the 25th May, 1909, the introduction of transport wagons and other vehicles and goods through the Ports of Entry at Ingeli Gate and Middledrift will be permitted only on production of a certificate signed by the District Resident Magistrate of Harding or Port Shepstone, as the case may be, in the form set forth in the schedule below, to the effect that they were hauled by horses, mules or donkeys when leaving Harding or Port Shepstone, which certificate must be completed by the owner or person in charge as provided therein before such vehicles or goods can be admitted through any of the Ports of Entry in question.

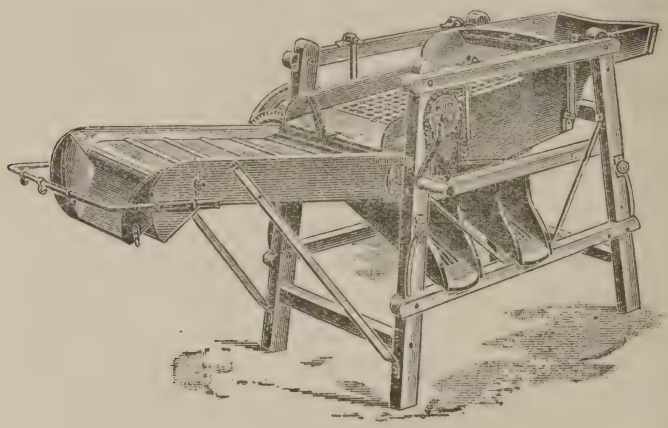
The form of the schedule referred to is as follows:—"I hereby certify that the ..... vehicles and goods in charge of ..... of ..... who is proceeding with them from Harding to Ingeli Gate, (*or Port Shepstone to Middledrift*), for the purpose of crossing the Cape Border, were drawn by ..... (*here insert number of animals and whether horses, mules or donkeys*) when leaving this village. ..... (*to be signed by* Resident Magistrate). Place ..... ; date ..... I hereby solemnly and sincerely declare that the vehicles and goods above described have been drawn all the way to the border from Harding (*or Port Shepstone*) by ....., and that no horned cattle have been yoked to the vehicles. And I make this solemn declaration consciously believing the same to be true ..... (*to be signed by* Owner or Person in Charge). Declared before me this ..... day of ....., 19 ..... (*to be signed by a* Justice of the Peace) ..... (*signature of* Officer in Charge at Port of Entry) .....

A New Potato Sorter.

A machine of very considerable utility, and one which should appeal to those interested in the question of the export of potatoes to England as well as to other parts of South Africa, is an improved form of potato sorter, fitted with a new sorting platform, which is now being placed on the market by Messrs. Cooch & Son, of Commercial Street, Northampton. This sorter—which is described in a recent number of the *Ironmongers' Chronicle*—is the result of several years' experience, and is confidently recommended as a thoroughly efficient and durable machine at a very moderate price. It is simple, strong, easy to work (as a boy can turn it), and is readily moved from place to place, especially if fitted with the new drop handles. It separates the potatoes into three sizes at the rate of from 30 cwt. to two tons per hour, and effectually removes the soil. The tubers are delivered into 1 cwt. bags, and these are arranged so that the machine can be worked continuously, one bag being removed while another is being filled. The seeds and chats are delivered at the side, the soil falling underneath, but customers desiring delivery on the opposite side, or one on each side, can have machines made to their order.

The sorter can also be adapted for onions, bulbs, chemicals, and many similar purposes. A novel and useful feature is the sorting platform introduced last season, which has given very great satisfaction and will be found invaluable to growers having a quantity of blights or diseased potatoes, or those wishing to make a specially good sample. It consists of a canvas with laths attached, which travels slowly and conveys the potatoes along, thus enabling all blights or badly shaped potatoes

to be readily seen and removed. It is attached to the separator by four bolts only, so that it can be very quickly fixed, and is driven by gearing direct from the crank spindle. It delivers the potatoes into bags and can be worked continuously. We reproduce herewith, from the *Ironmongers' Chronicle,* an illustration of the sorter which gives a good idea of its general appearance.



Cotton Culture.

The following interesting letter, sent to the Editor of the *Natal Mercury* by Mr. Chas. Hill, a Zululand settler, contains much that is encouraging to those who are losing hope as regards the possibilities of Natal and Zululand as a cotton-growing country. Mr. Hill's suggestion that the Natives be instructed in cotton-culture and be induced to take it up, selling the unginned cotton for cash to storekeepers and others, is interesting and worthy of consideration. In parts of West Africa the Natives grow cotton satisfactorily, and it is quite possible the same thing might prove feasible here. Mr. Hill's letter is as follows:—"Sir,—No need exists for pessimism as regards cotton culture. I have proved that Zululand grows cotton free of ball-rot, and it can be raised with no extra work than that required for mealies. The picking is the only tedious work. Trees planted here fifteen years back are bearing cotton, although quite uncultivated. Last year, despite the fact that my land was badly prepared, insufficiently fertilised, and denuded of labour by the last comic opera military demonstration, from 11 acres I pulled 2,312 lbs. of cotton (the seed was planted two months late), and sent 1,500 lbs. to Mr. Kirkman, who kindly ginned it and sent it Home. It must not be taken as failure that the returns were not satisfactory; it was my ignorance, but experience will remedy that. A man to grow cotton requires capital, and in Zululand we have lost our oxen that broke the land. Cotton land wants good preparation,

and the oxen supplied economical traction. Mules and donkeys are expensive, and subject to disease. As I have repeatedly written, our leasehold tenure ties our hands, and we cannot receive any financial assistance, as our leases are of no value. The Transvaal cotton planters can get all the capital they require, while I cannot get sufficient to buy a team of donkeys. Mr. Kirkman knows the possibilities of Zululand as a cotton country. The Natives have lost the whole of their cattle, and I proposed the handing of small parcels of seed to them, with a view of raising crops, and for the storekeepers to buy at, say, 1½d. per lb. for bolls. There should be a gin in a central position locally or in Durban. The missionaries I have spoken to consider the proposition feasible, as the women and children will do the work, but as the bags of cotton are delivered they want to see a cash return. If settlers could place their unginned cotton as easily as they do mealies, we would grow respectable quantities, but for small men to find gins, packs, freights, and then await a return from England of, say, three months, puts cotton out of the question for any but strong financial men. Let capital be made available, and Zululand will provide sufficient cotton to be a respectable asset to the country. To expect individual effort in Natal to do what any other country considers a national undertaking is not feasible."

Introduction of Wood and Grass into O.R.C.

It being considered expedient to amend the Orange River Colony Proclamations (Nos. 13 of 1909, and 48 of 1908) dealing with the introduction of firewood, brushwood, timber, grass and grass hay from the Colony of Natal to the Orange River Colony across the Natal Border, the O.R.C. Government has issued a new Proclamation (No. 41 of 1909) on the subject, the provisions of which are as follows: From and after the promulgation of this Proclamation, the introduction of any of the articles hereinafter mentioned into this Colony from the Colony of Natal shall be subject to the following prohibitions and provisions:—(1) The introduction of the following articles is absolutely prohibited, *viz.*: (*a*) Mealie stalks, leaves and cob husks; (*b*) Kafir corn stalks, leaves and heads; (*c*) Sugar cane or any parts thereof; (*d*) Brushwood; (*e*) Grass or grass hay or any articles packed in grass. (2) The introduction of any timber or wood, including firewood, is absolutely prohibited, except as hereinafter provided, *viz.*: (*a*) Newly manufactured timber, new or second-hand vehicles and bamboo whipsticks may be introduced without restriction; (*b*) Barked wattle poles (including those intended for firewood) or other barked poles and second-hand manufactured timber which has been used in the construction of any building or article may be introduced if accompanied by a certificate in the form set forth in Schedule A signed by a Justice of the Peace or Stock Inspector of the Colony of

Natal or a member of the Natal Border Guard of this Colony and bearing date not more than seven days previous to that of the said introduction. (3) Lucerne or lucerne hay or any other forage crop, though containing an admixture of grass or grass hay may be introduced if it appears to the satisfaction of the Customs Officer member of the O.R.C. Police or of the Natal Border Guard at the place of entry that the said lucerne or forage crop was grown in enclosed lands on which no cattle have been depastured and that grass has been cut together with the lucerne or other forage crop.

Any person introducing or attempting to introduce, whether as principal agent or servant by himself or another, any article into this Colony in contravention of any of the above provisions, shall be liable to a penalty not exceeding fifty pounds, or, in default of payment, to imprisonment with or without hard labour for a period not exceeding six months. Proclamations No. 13 of 1909, and No. 48 of 1908, are repealed. The following is the form of the schedule referred to above: "I hereby certify that the undermentioned articles have been disinfected by being dipped in or thoroughly sprayed with a solution made by dissolving one pound of arsenite of soda in twenty gallons of water. Description of timber or vehicles ..... Date ..... Signed .... (Justice of the Peace or Stock Inspector of the Colony of Natal or Member of Natal Border Guard of O.R.C.) .... Address."

East Coast Fever Regulations.

In terms of Section 3 of Act No. 34, 1906, the Minister of Agriculture has ordered (Government Notice No. 342) that, from and after the 1st July, 1909, no movement of cattle shall be allowed from the Province of Zululand. Any person disobeying this Order is liable to a fine not exceeding £100, or to imprisonment, with or without hard labour, and with or without the option of a fine, for any period not exceeding six months. All orders heretofore issued, in so far as they are in conflict with this order, are by this Notice superseded. The Minister has also ordered (Government Notice No. 352) that, from and after the 15th July, no movement of cattle shall be allowed into, within, or from the Magisterial Divisions of Vryheid, Ngotshe, and Paulpietersburg. Notwithstanding this prohibition, however, healthy cattle intended for immediate slaughter may be moved into, from, or within any of the Divisions in question, on permit granted by the Chief, Veterinary Division, or by an officer appointed by him to issue such permits, and in special cases where it appears to him desirable the Chief, Veterinary Division, or an officer appointed by him, is authorised

to issue permits for the removal of other cattle into, from, or within any of the said Divisions, subject to such conditions as he may see fit to impose; removal to be made within the time and according to the directions contained in the permit, and not otherwise. In terms of Act No. 32, 1903, any person disobeying this Order is liable to a fine not exceeding £100, or to imprisonment, with or without hard labour, and with or without the option of a fine, for any period not exceeding six months. All orders heretofore issued, in so far as they are in conflict with this Order, are superseded by this Notice.

By virtue of the powers conferred on him under the East Coast Fever Act No. 32, 1903, and all amending Acts, the Minister of Agriculture has ordered (Government Notice No. 356) that, from and after the 15th July, the removal of hides, horns, hoofs, hair and heads of cattle, cut grass, manure, litter from places where cattle are kept, and lucerne or other fodder, from, into, or within the Magisterial Divisions of Vryheid, Ngotshe, and Paulpietersburg is prohibited except on permit granted by the Chief, Veterinary Division, or by an Officer of the Veterinary Department authorised by him to issue such permits. Any person disobeying this Order is liable to a fine not exceeding £100, or to imprisonment, with or without hard labour, and with or without the option of a fine, for any period not exceeding six months.

With reference to Government Notices Nos. 505, 1909, and 735, 1909, whereby I prohibited the removal of lucerne or any other fodder from, into, or within any infected area except upon permit obtained from the Advisory Committee or Committees concerned, the Minister of Agriculture has ordered (Government Notice No. 343) that, from and after the 1st July, 1909, the removal of lucerne or any other fodder from, into, or within the Magisterial Divisions of Alfred, Alexandra, Bergville, Camperdown, Durban, Dundee, Estcourt, Inanda, Ixopo, Impendhle, Ipolela, Krantzkop, Klip River, Lion's River, Lower Umzimkulu, Lower Tugela, Mapumulo, Newcastle, New Hanover, City of Pietermaritzburg, Richmond, Umgeni, Umvoti, Umlazi, Umsinga, Utrecht, and Weenen, is prohibited, except on permit granted by the Chief, Veterinary Division, or by an officer of the Veterinary Department authorised by him to issue such permits. All permits issued by Advisory Committees, District Committees, or Permit Officers appointed by such Committees, for the removal of lucerne or any other fodder into, from, or within any of the said Divisions shall, from the 1st July, 1909, be cancelled and become null and void. A fine not exceeding £100, or imprisonment, with or without hard labour, and with or without the option of a fine, for any period not exceeding six months, is the penalty for contravention of this Order.

The Order contained in Government Notice No. 671, 1908, prohibiting the acquisition of cattle by any person, whether by sale, barter, gift, or otherwise, except under the conditions of a permit issued by the Minister of Agriculture, has now been made applicable to the Magistrial Divisions of Vryheid, Paulpietersburg, Ngotshe, Inanda, Lower Tugela, and Mapumulo (Government Notice No. 383). By Government Notice No. 355, the Minister of Agriculture has ordered that, from and after the 15th July, 1909, all permits issued by Advisory Committes, District Committees, or Permit Officers appointed by such Committees, for the removal of cattle, hides, hoofs, horns, hair, and heads of cattle, cut grass, manure, litter from places where cattle are kept, and lucerne or other fodder, into, from, or within the Magisterial Divisions of Vryheid, Ngotshe, and Paulpietersburg, shall be cancelled and become null and void. A Government Notice (No. 326) has been issued cancelling Government Notice No. 240, 1909, whereby a zone was declared on the commonage of Greytown.

Do not teach the colts bad habits. What seems cute to-day may be vicious in a few months.

RATE FOR CITRUS FRUIT EXPORT OVERSEA.—The General Manager of Railways announces that, with effect from July 1st, 1909, the rates appearing in Clause 60, page 38, of Goods Tariff Book No. 22, for fruit exported oversea beyond South Africa will only apply to fruit consigned through the Government Grader. Fruit not so consigned will be charged at the S.A.P. "B" rate.

The following addition to paragraph 1 of Clause 33 of the N.G.R. Goods Tariff Book No. 22 has been approved by His Excellency the Governor in Council:—"The above regulations also apply to trucks containing grain for export oversea beyond South Africa, instructions for disposal of which are not received within 24 hours of their arrival at Point, notwithstanding that the Railway Department may under their contract be required to undertake the off-loading."



Photo. by] *[J. J. Stephenson.*

TRANSPORT EXHIBITS AT THE "ROYAL" SHOW.—II.

Natal Transport Department's Conveyances.

Irrigation: Past, Present and Future.

By F. E. KANTHACK, A.M.I.C.E., *Director of Irrigation, C.C.*

(*Continued from Page 722, Vol. XII.*)

LANDS, GOOD AND BAD.

SOME lands are naturally adapted for irrigation as regards subsoil drainage, surface slope, mechanical and chemical condition of the soil. Other lands are deficient in some respects, but are capable of being made fit for irrigation by means of suitable treatment, such as subsoil drainage of terracing, etc. There is a limit, however, to the amount of correction which can thus be applied, and this is determined by financial considerations. Even when we come down to the area of land in the river valleys and vleis, and the Karroo soils of sufficient depth to warrant being brought into a scheme, on careful investigation we find much picking and choosing necessary. Surface conditions are misleading. We must examine the subsoil if irrigation is contemplated, and here we find pot-clay, lime banks, gravel beds, close to the surface, alkali deposit, and what not. Taking a typical area in the western Karroo valley, for which a careful soil survey was made for a proposed irrigation scheme, the good soil amounted to less than 50 per cent. of the area considered irrigable. Irrigation development must proceed strictly on business lines. No scheme should be undertaken which will not, after the most critical examination, promise a sufficiently good return to redeem all capital charges within a reasonable short period, and at the same time promise perpetual improvement of the land irrigated, or which cannot be shown clearly to be justified as a permanent insurance against losses in times of drought. A scheme which is neither profitable nor protective is not justified, and in considering, therefore, the area of land which may ultimately be brought under irrigation the business aspect must be considered equally with the physical aspects. Broadly speaking, I think we shall find that where suitable land exists, the area which can be placed under irrigation will be limited by the amount of water which we can bring to it. Taking the last census figures for what they are worth we might expect that about half a million acres are now under irrigation in the Colony. At a moderate estimate it should be possible to increase this area to three million acres at some future date, but very much more scientific methods of irrigation must first become the rule and not the exception.

PUSHING DEVELOPMENT.

Now, how are we to proceed to push development to the utmost extent and guide it carefully along sound lines? We must, in the first

place, know what our possibilities are, and by this I do not mean that we should confine our attention to large concentrated schemes. We must push on with our reconnaissance work till we know broadly, throughout the Colony, what amount of run-off we have got, how this may be increased, how and where it can be stored, localise all land suitable for irrigation, and investigate the best means and approximate cost of bringing the water in proper quantities to the land. This reconnaissance work brings to light possibilities for promising big schemes which require to be taken us as a whole. Other schemes are discovered which are capable of being developed gradually, that is started as a series of small individual schemes which at a later date, when considerable development has taken place, can be merged into a big project with possibilities of extension. Storage sites must be assiduously searched for and investigated, which may either benefit existing irrigation or form a source of supply for new irrigation. Finally, every effort must be made to discover the small local possibilities on each farm, be they in the nature of works for utilising flood water on lands or on the veld, storage works for irrigation and stock, or methods for the reclamation of the veld and prevention of sluits. This work has been started in this Colony, but the staff is minute, only one survey party of three young engineers being employed, and the country is vast. My endeavour is to take each of the big river systems in turn. For a work of this nature, I think with envy of the results obtained by the famous Reclamation Law of the United States of America, which provides that all moneys received from the sale and disposal of public lands in 16 Western States from the year 1901 (with the exception of five per cent. already reserved for education) shall be appropriated to a special reclamation fund, to be used for the examination, and survey for, and the construction and maintenance of irrigation works for the storage, division and development of waters for the reclamation of arid and semi-arid land. The survey work done by the Reclamation Service is monumental, and has been productive in the elaboration of a large number of notable irrigation projects now in course of construction. Where public lands come under irrigation, land is sold in lots not exceeding 160 acres. Settlers must pay off all cost of land and irrigation works in 10 instalments, and do not receive title till half the area has been reclaimed. We might have had something similar in the past, but I am afraid the time has gone by, very little Crown lands now remaining. Still even now such a fund would be useful for reconnaissance work, and detached surveys of big storage sites.

ADVICE TO FARMERS.

Coupled with this search for possibilities, there will be the present system of giving advice at nominal rates to farmers desirous of embarking on irrigation works, of granting loans for such works

of any approved character on easy terms; and the Agricultural and Irrigation Departments must do all in their power to bring home to the farmers the advantages of irrigation and better agricultural methods, and demonstrate what these methods are and how they are to be applied. This policy is no mere pandering to what townsmen are apt to look upon as a backward, pampered class. It is vital to our future existence and prosperity that no labour and money should be spared to lift up this country's only true lasting industry from its present depths to a higher and higher level. At the same time the part played by the State in promoting development must not be allowed to run wild in doing all the things just enumerated. But it is undoubtedly the function of the State to carry out complete hydrographic survey operations, seek out storage or irrigation possibilities, advise farmers professionally, and help them with easy loans, make irrigation and agricultural experiments, demonstrate improved methods, and educate generally. It is also advisable to undertake the construction of large or difficult irrigation and storage schemes for the purpose of creating closer settlements. It is, however, essential that in a country such as this the State should keep clear of projects carried out and permanently administered by the State. The Indian Government, as owner of the vastest and grandest irrigation system the world has ever seen, is working under a set of conditions which could not possibly exist in a Colony such as this; and quite apart from the peculiar social and fiscal conditions of India, the great size of individual schemes makes State ownership and management imperative. Thus on the Cherab Canal, in the Junjab, over one million souls have been settled on what in 1890 was a desert, and this mass of humanity is dependent for its very existence of this great canal system. With us here, and the same applies to other Colonies and to the States, it is essential that the financial responsibility of the scheme shall rest with the people benefiting by it, that is to say, irrigation development must proceed by means of State-assisted co-operation on hard and fast business lines. The terms may be made very easy, as the increase in national wealth will rapidly repay the State for any temporary losses on interest or for the cost of administration, etc. The irrigating farmer must feel, however, that he is a shareholder in the scheme, and that, therefore, he must do his utmost to keep it to a high pitch of efficiency. It will have been noticed that the American Reclamation Law embodies the co-operative principle, and the terms of redemption in ten years would be considered very severe in this country. As a matter of fact, such terms would at present be prohibitive here. In only one direction is State enterprise and permanent control justified here, and that is in the planning, construction, and subsequent control and maintenance of storage works serving miscellaneous interests. Even in America under the Reclamation Law it is

provided that the title to, management and operation of, the reservoirs, and works necessary for their protection and operating shall remain in the Government.

INSURANCE AGAINST DROUGHT.

So much for the State's share in development. I will now briefly consider some influences which have an important bearing on the subject, and which are fundamental when considering the feasibility, or otherwise, of irrigation projects, large and small. With the exception of purely protective works—that is, schemes to insure a certain district against periodical severe drought or famine, where the proposition must be considered from an insurance and sentimental point of view—all *bona-fide* irrigation schemes must be clearly justifiable from a semi-commercial point of view. I say semi-commercial, as land development is often slow, and State-aided schemes may be undertaken which, from an ordinary commercial point of view, require many years to pay off arrears of interest and reach a productive stage. Irrigation schemes, generally small ones, in connection with stock farms, may be commercially justifiable entirely from an insurance point of view. Now, judged by these standards, whether a scheme is justifiable or not depends, firstly, on the capital cost of bringing water to the land and preparing the latter for irrigation; secondly, upon the capital value of the land in its unimproved aspect; thirdly, working costs, and, fourthly, market for the produce.

The first and second of these conditions are closely related, and the maximum commercial price for land with irrigation possibilities depends largely on the average cost of improvements. The cost of bringing land under irrigation in South Africa is very high indeed. Schemes costing £5 per acre are comparatively rare. £10 per acre, or thereabouts, is common and financially sound at present. Many irrigation schemes in this Colony have cost £20 and even £30 per acre. This does not, of course, include pure insurance works which may often cost upwards of £100 per acre and be thoroughly sound. The Ashton Canal, which commands 40,000 acres, of which for the present only 35,000 acres of the best are included in the project, is estimated to cost about £9 per acre. In the Transvaal a large number of the large projects have been worked up, and, taking the six proposed along the Vaal River, the capital cost per acre ranged from £12 15s. to £22. Now, let us compare these costs with those in other countries. In the Punjab, in Upper India, the five completed major canals have now an actual annual irrigable area of 4,923,000 acres, and the actual cost of construction has amounted to only £1 12s. per acre. As a considerable area is systematically followed, the annual irrigation is only about three-quarters of the total area irrigable, and the capital cost per irrigable acre is therefore even less than this. In the United Provinces

of Agra and Oudh the four major canals, with an annual irrigation of 3,390,000 acres, the average capital cost was, curiously enough, also £1 12s. per acre. In the United States, irrigating 5½ million acres, costing 7·8, or again £1 12s. per acre. Taking 14 schemes being carried out under the Reclamation Act in 14 different States, the estimated capital cost is from £4 to £6 per acre, and amounts to £8 in one case. In Spain a canal through very rough country and presenting exceptional engineering difficulties is now approaching completion at the cost of £5 per acre. The figures quoted above show clearly that at present South Africa is at a great disadvantage as regards cost of construction. Within the past decade the great Punjab Canal Settlements have built up a gigantic wheat export trade, which has risen from small dimensions till the quantity supplied from Karachi has reached close on one million tons per annum. The grain is bagged and carried nearly a thousand miles by rail to the sea coast at commercial freight rates and is about the only wheat which is grown under perennial irrigation, and can yet profitably supply the great European market. The secret of Indian irrigation economics is cheap labour, and it is labour par excellence which constructs canals. Practically all materials of construction are in that country produced on the spot. Under such conditions one need not be too particular regarding the excellence of the land to be irrigated. But how different are things here. Very few of our bigger schemes are going to cost much less than £10 per acre, which fact, together with other adverse conditions greatly limits our scope for enterprise. Most troubles in South Africa arise from expensive, indifferent, and insufficient labour and irrigation and agricultural enterprise generally, which is almost wholly dependent upon labour, is one of the worst sufferers.

Capital Value.

We now come to the second question—*viz.*, the capital value of unimproved land—and promptly meet renewed difficulties, as those values are in many cases so high as to preclude profitable development. In the earlier portion of this address I expressed myself grateful to the ostrich feather industry. In this connection it is proving mischievous. Land under lucerne has been run up to enormous prices, which require the highest class of ostrich farming with the present top prices in feathers to pay interest on capital, and this state of things is unsound and dangerous. But, far worse than this, unimproved lands, with reputed irrigation potentialities, is steadily rising in price, and has, in many cases, made the purchase of such land for development purposes very risky and foolish. The spirit of speculation has seized the landowners, and irrigation possibilities are now dealt in much the same manner as are highly-speculative syndicate shares on the Stock Exchanges of Johannesburg and Capetown. The man owning

the proposition draws up, with the help of his law agent, a wonderful advertisement which would do credit to a professional company-promoter. To develop his own land or invite sound co-operation is about the last thing which occurs to him. The majority of enterprising farmers who have gone in for irrigation have, firstly, to buy a farm with possibilities at a fancy price—far too high considering the subsequent cost of development, and the young, energetic farmer, full of zeal to develop a property, but with small capital, finds it impossible to get anything at a reasonable figure, or else starts his enterprise with a crushing mortgage bond, which is sooner or later the undoing of him. Before we can expect great development in irrigation it is essential that land shall be obtainable on much easier terms. Thirdly, we have working costs, and these must be reduced to the lowest figure compatible with efficient management. This is a matter where both irrigation and agricultural departments must come to the rescue. Irrigation is a science, but hardly so in this country, where it often consists in spilling water about. By experiment at selected Government stations, and by careful advice and demonstration, farmers must gradually be taught to improve their methods, so as to obtain the maximum efficiency—*i.e.*, to get the greatest value in crop with the least labour and most economical use of water. I can assure you there is a vast amount to be learnt still in this direction. Bad irrigation is not only costly, but is disastrous to the land. Working costs include interest on capital, and if high grade crops are grown it is often feasible to instal a pumping plant at comparatively small cost, but with high working expenses, in preference to spending a large amount of capital on a gravitation scheme, with low working costs.

MARKETS.

Fourthly, markets have to be considered. Development has gone on fairly rapidly during the past few years, and where foodstuffs are grown under irrigation, the supply locally exceeds the demand. We are in many lines rapidly reaching the difficult period when production exceeds home consumption, but is for several reasons not marketable outside the country. The population of South Africa is very small, and the home market is restricted to the larger towns. In summer the climate is prejudicial to the carriage of perishables and distances are great and transporth slow; hence we have still the anomoly of Capetown importing certain foodstuffs which are sold at great loss within the Colony. Irrigation is at present largely given over to ostrich farming, but it is obvious that the limit here is soon going to be reached, and the question of markets is intimately mixed up with irrigation development. Transport being one of the determining factors, irrigation should first be developed as much as possible in the most favourably situated parts of the country. This is especially necessary where closer settlement is aimed

at. Again, under present conditions, the sudden establishment of very large areas of concentrated irrigation, growing produce for which no over-sea markets exist would be economically disastrous. In only one part of the Cape Colony can cereals be grown profitably under irrigation, *viz.*, along the Zak and Fish Rivers of the North-western Districts, where the very peculiar topographical, climate, and flood conditions make possible a system of basin irrigation somewhat resembling the old Nile system. Fifty to one hundred-fold yields of good wheat are assured in most years, with simple and inexpensive works, and with a minimum of labour, and I have calculated that with more careful control of the flood waters 300,000 to 400,000 bags of wheat could be produced here in an average year. Given a developing railway line from Carnarvon through this wheat-growing area to Calvinia, grain could be delivered at Hutchinson or De Aar at a considerably lower rate than imported or Western Province wheat.

The Stock Farmer.

Elsewhere our irrigation will be confined to lucerne, sweet grasses, roots and other crops required for stock-farming, potatoes and vines, orchards and vegetables. The stock-farmer, who will always be the mainstay of this country, has unrestricted scope for irrigation, but his lands must always constitute a small proportion of his whole farm, and if he converts all the produce of irrigation into live meat before it leaves his property. Under close settlement schemes, things are very different. Produce is generally sold off the land, and has to be transported to the markets. In future I hope to see fibre plants and sugar-beets, and perhaps cotton, grown under irrigation, but these industries have yet to be established, and a vast amount remains to be done in the way of improvement in the products grown, cheaper production, better transport facilities, and co-operation in dealing with produce, which requires to be worked up before it is marketed. These are some of the reasons why I am strongly in favour of developing irrigation from small or moderate units, and allowing them to extend and later merge into big ones rather than start straight away with large costly projects, which, as we are at present situated, would cause a hopeless glut in the market, and mean ruin to the settlement. We must not think that because American irrigation is capable of expansion at the rate of hundreds of thousands of acres per annum that the same could be done here at our stage of development. The American market is probably unique in its capacity for consumption, and what they cannot consume at home or export they manufacture into some other product for which there is a market. Our home market is probably the worst in any white man's country, and till we can increase home consumption we must grow for export, and here we must not outrun our capabilities.

IRRIGATION WILL EXTEND.

Irrigation in South Africa will extend on a number of distinct lines. First and foremost, by small schemes belonging to single farms, which may be worked from storage reservoirs, from wells or boreholes, or with flood water. Secondly, co-operative schemes, generally of moderate size, but as the farmers become more experienced in irrigation matters projects like the proposed Ashton Canal, to irrigate 40,000 acres and more should be quite feasible. Thirdly, close settlement schemes, in which the Government owns the irrigable land, constructs the works, and sells the land in small blocks to suitable men under a system by which, after a given number of years, the settlers will become owners of both land and canal works. Fourthly—and finally—large State-owned schemes in which water is sold to the irrigators. For the present the first and second of these types—*i.e.*, individual private and co-operative schemes—offer the greater scope for successful development, and will always be the dominating type. They are more likely to keep pace with developing market conditions, and are peculiarly fitted to the development of a spirit of progressive farming, as they are much more certain of success and offer the line of least resistance to the breaking down of prejudices to which I have referred at considerable length at the commencement of this address. These peculiar characteristics must be overcome by tactful education, object lessons, and gradual squeezing out of the hopelessly incorrigible; but they cannot be overcome by impatient methods which, under present conditions, are apt to lead to dismal failures, the effect of which is a triumph for the retrogressive element. One great hindrance to the extension of the area under these two types is the present very large area of most irrigable farms, especially in the East and Midlands. As dry stock farms these large areas were justified, but under irrigation they are far too big for one individual to manage, and their subdivision into a number of smaller properties, each having a moderate area of irrigation, is essential to full development. While this may be described as normal development, our social troubles already alluded to have made the establishment of close settlements, as defined under heading No. 3, a necessity. These settlements will tax our organising powers greatly. We shall have to deal with a most difficult class of people, who must be dealt with tactfully, yet with great firmness, and their methods of work must be under strict control for a long time. The holdings must be sufficiently big to provide a man with more than a living wage. He must be able to better himself. Such schemes should be worked together with co-operative institutions for the working up and marketing of their produce, and there should always be a good leaven of experienced, hard-working men amongst the settlers, who will act as object lessons. Church and State can do great things



A FINE EXHIBIT OF FARM PRODUCE.

This fine show of vegetables was exhibited by Mr. W. Mercer, of Cato Ridge, at the recent Durban Show. The Condensed-milk can in the centre will give an idea of the size of some of the smaller articles—such as the chillies on either side of the tin, the peas on the right, etc.

by working hand in hand in many such schemes. Finally, there are the big State-owned schemes, and my opinion is that for many years to come we can do no good with these in this Colony. They are utterly unsuitable for the poor white class, while the better class farmer has years of work before him on his own lands, and in parts of the Colony better situated for irrigation enterprise than the only likely areas for big schemes. Such big schemes will all be very costly—at present prices of labour and material, largely prohibitive—and that is all the more reason why money should be spent on schemes of the first three types, which are all more certain of success.

I must apologise for detaining you so long, but the subject of irrigation development is so difficult and complex in South Africa that it is difficult to convey the various aspects of it in an address of this kind. I only hope that the main principles put forward, which I think must govern the extension of irrigation in this Colony, have not been obscured by the length of some of my arguments.

If you believe in sheep, but feel as though you couldn't afford to give them your personal attention, buy a few for the boys and give them to them outright. It will be better than a savings-bank account and will give them a fixed interest at home.

Often in the management of farm work the greatest puzzle is the employment of hired help on rainy days. The thoughtful manager will try to so plan his work that harness can be oiled and farm implements fixed up at such times. Many things can be done, as, for instance, peeling fence posts, sorting potatoes, inside whitewashing, clipping horses and a score of other things.

According to the *Standard of Empire* of June 10th, the announcement that the United States is taking steps, by establishing free trade between the Philippines and the American ports, to close the Philippine market to other markets, has led to local inquiries as to whether, in the lessened trade with Europe in Manila hemp which might be expected to follow the restrictions, New Zealand flax would be imported more freely into England.

Alcohol for Industrial Purposes.

SOME NOTES ON ITS USE.

By J. F. E. BARNES, C.M.G., *Chief Engineer, Public Works Department.*

THE following notes on the use of alcohol for industrial purposes, based upon information which has been collected by the Government and upon various magazine articles and books which I have read, I have prepared in the hope that they may be of assistance to those interested in the subject of industrial alcohol.

In the *Engineering Record* of May, 1908, there was published an article referring to exhaustive comparative tests of alcohol and gasoline engines which had been made by the Technological Branch of the United States of America Survey Department. The gasoline engines employed were the standard American Stationary Engine type, 10 to 15 b.p., at speeds of 250 to 300 revolutions per minute; while the alcohol engines were of similar construction and identical in size with the gasoline.

As a result, it is stated that "correspondingly well-designed alcohol and gas engines, when running under the most advantageous conditions for each, will consume equal volumes of the fuel for which they are designed." The average minimum obtained in the tests is given as 0.8 pints per hour, B.H.P., both for gasoline and for alcohol. The air was not pre-heated for the tests for either alcohol or gasoline; the engines were equipped with the ordinary type of construction level suction lift, and construction level spray carburetter.

Special tests with aid pre-heated at 250 degrees, Fahr., were also made, but no beneficial effects were found. The importance of this is manifest. The denatured alcohol used in the trials was 100 parts methyl alcohol *plus* 10 parts methyl alcohol *plus* half of one part of benzol.

No detrimental effects on the cylinders and valves were found. This is reassuring and should help to clear away the prejudice which has existed in that regard; moreover it bears out a statement of Mr. Petchell, of Reynolds Bros., in which he calls attention to the injurious effects arising out of the fact that the spirit which is denatured and sold as methylated spirit in Natal is about 60 to 62 per cent. only and utterly unsuitable for motor car work. It is, however, also explained that even this is not serious when the engine is worked daily, but that the metal of exhaust valves and ports is seriously affected if the engine is simply stopped and left alone for some weeks. But this difficulty, he states, can be overcome by injecting paraffin into the cylinder whilst hot and giving the engine a few turns by hand. "When this has been done the signs of corrosion are entirely absent even after stoppage of several months."

Again, the tests as reported in the *Engineering Record,* show that "the lowest consumption was obtained with the highest pressure which it was found practical to use." For the denatured alcohol the pressure referred to was from 150 to 180 lbs. to the square inch above atmosphere. It is, of course, understood that this comparatively low pressure for alcohol was limited by the unsuitability of the engines which were employed. The safe pressure to which alcohol may be used (200 lbs. per square inch) in properly constructed engines, is immensely greater than that of petrol, and of course this high pressure obtainable from alcohol gives it a distinct advantage over petrol. In this regard the article makes it clear that, though alcohol can be used in stationary gasoline engines, yet its use under these conditions must be unfavourable to alcohol if only because of the fact that gasoline engines are not built to stand the considerably higher explosive pressure which can and should be obtained from alcohol.

During the tests it was also found that "in no instance was the thermal efficiency of gasoline higher than that for alcohol."

Altogether it is clear that in such tests alcohol is at present handicapped, and in this regard it is remarked that "the possibilities of altering the ordinary gasoline engine so as to obtain the *best* economy with alcohol are very limited."

There was an interesting article in *Cassier's Magazine* of September, 1906, in which reference was made to the fact of a "Free Alcohol" Bill being about to be introduced in the United States, and to the stimulus such should give to denatured alcohol for power purposes. The Bill referred to has since become law. The article was illustrated with some good photos of alcohol locomotives as built in Germany, and showed some of the purposes for which they are used, as, for instance, for hauling timber in a forest near Darmstadt, for passenger service on a tramway at Lima, Peru, for hauling merchandise on a factory railway near Cologne, Germany, etc. At that date German alcohol locomotives of this description were built up to 32-h.p.

In a catalogue from George Stade, of Berlin, is shown the "Standard Incandescent Lamp." The 300 c.p. size is stated to consume alcohol at a cost of three farthings per hour; and the lamps are made in various sizes from 40 c.p. up to 300 c.p. The selling price of a 60 c.p. lamp, postage paid, parcels post, is quoted at £2 1s.

Amongst the advantages of the alcohol or spirit lamp may be quoted the following:—

(*a*) There is no danger of explosion.

(b) It is lighted like a gas lamp, and therefore free of the trouble, etc., attendant upon oil lamps.

(*c*) It is admirably adapted for the lighting of public places.

(*d*) It is available as a stand-by in cases of failure of electric light where such has been installed.

(*e*) It should also be most suitable for village lighting, always assuming, of course, that commercial denatured alcohol is obtainable at reasonable rate of cost.

(*f*) Another point in its favour is, that for equal illuminating power, the alcohol lamp consumes about one-third of the air, and generally it throws off about one-third of the heat of a paraffin lamp.

A catalogue from Moritz Cohn, jun., also of Berlin, which I have had in my hands, contains ocular demonstration of the extent to which the Germans have brought into practical use alcohol for lighting and heating purposes, as, besides lamps, there are obtainable heating stoves, spirit lamps, flat-irons, etc., at moderate rates.

"The Fuels Committee Report," issued by the Motor Union of Great Britain and Ireland in 1907, is particularly deserving of perusal as it deals with the subject of alcohol for motor and industrial purposes practically from A to Z, and much that is of interest I must pass over in order that my remarks may be confined to reasonable limits.

On the question of cost the evidence adduced by the committee showed that it was possible to manufacture "pure alcohol" (from peat) at a cost as low as 3d or 4d per gallon, that 11½d. may be taken as the English rate of production, that the price of alcohol of commerce, as at present, is affected by the fact that in order to meet Excise Regulations it has to be "denatured" and is subject to heavy duty, which together raise the price to 2s.

Prominence is given to the fact that, in Germany, the consumption of spirits for industrial purposes had, in the six years previous to 1907, grown from 15¾ million gallons per annum to 26 million gallons per annum, while during the same period Great Britain comparatively stood still.

In Germany, alcohol is largely produced from potatoes, though beet is also made use of, but apparently the most economical source is sawdust, brushwood and refuse being also used for the purpose. The enhanced value of timber in any country where alcohol is free for industrial use is obvious. Referring to this view of the matter, it is remarked that in Norway, Sweden, and America, and such like countries, "it seems as though it will be possible to make alcohol in the near future at such a price that it will become the fuel."

The wisdom of the German Government in fostering afforestation and allowing the chemical industry to have "duty free" alcohol (since 1891), is commented upon. The comparatively small loss of direct duty to that Government has, it is shown, been many times recouped by the

prosperity which has accrued to the country as the outcome of this far-seeing policy. Germany has thereby practically secured the world's trade of dyes, drugs and artificial perfumes, while "to encourage agriculture and to retain within the kingdom some portions of the enormous sums being expended for oil, for lighting and power, the German Government put forward a system of taxation and excise which encourages the cultivation of potatoes and the establishment of distilleries in potato-growing districts" (*vide* page 58). As a direct consequence, the annual potato crop, which in 1887-91 averaged 27 million tons per annum, had in 1901 grown to 40 million tons. About three-fourths of all the alcohol produced was made from potatoes, thus adding enormously to the area of cultivated land, while at the same time encouraging the settlement of a large population in healthy occupation, and so obtaining a direct advantage as regards the physique of her people over those countries which depend upon the industries and manufactures confined to cities and towns.

It is explained that, although grain contains a larger proportion of starch, yet potatoes will always be the more economical source of fuel alcohol, because the yield per acre is so much greater, *e.g.*, where an acre of grain will yield 8½ cwt. of starch, an acre of potatoes yielding a crop of 125 cwt. will give 22 cwt. of starch. A ton of potatoes is reckoned to yield up to 30 gallons of 90 per cent. spirit, and bearing in mind that the best potatoes may be sent to the ordinary market, and that the remainder fully answers the purpose of the distilleries, it is evident that the value of the potato crop is thus greatly enhanced.

The entire report is so full of telling facts and figures that an interesting article which would fill an entire number of the *Agricultural Journal* from cover to cover might easily be made up of extracts and comments, but the outstanding conclusions arrived at are as follows:—

(*a*) Alcohol can be cheaply produced from sawdust, potatoes, molasses and many other everyday forms of vegetation, including mealies.

(*b*) The spirit is entirely suitable for motor power.

(*c*) Being a home production it is therefore, at any reasonable price, more economical and of much greater value to the particular country in which it is produced than petrol or other imported fuel. This phase of the question is particularly applicable to Natal.

(*d*) The "flash point" of alcohol (60 per cent. Centigrade) is much higher than of petrol, which is anything down to 10 degs. below freezing point, hence it can be carried and stored with much less risk and without the restrictions attaching to petrol.

(*e*) The fumes of alcohol are comparatively innocuous.

(*f*) With carburetters giving complete combustion, and with due attention to ordinary details, suitably denatured alcohol is free from corrosive action.

(*g*) The thermal efficiency of alcohol is nearly double that of petrol.

(*h*) In the event of alcohol taking fire it is easily extinguished by water. In this respect alone it has a great advantage over petrol.

(*i*) Benzol as a denaturant is recommended, as, while it renders alcohol undrinkable, it is at the same time free from the disadvantages of other denaturants with respect to its employment for motor or stationary engines, and above all it is cheap.

(*j*) As benzol is a by-product of coal and of coke, its adoption in connection with alcohol distilleries for industrial purposes would be highly beneficial to Natal collieries.

(*k*) Practical limit of compression is 200 lbs. per square inch, and its explosive pressure much higher than petrol, which, in view of possible pre-ignition, is limited to 80 lbs.

(*l*) The less rapid propagation of the alcohol flame gives a more uniform pressure throughout the stroke.

(*m*) The denaturing agent used in Germany consists of a mixture of methyl alcohol, 1 per cent.; benzol, 2 to 20 per cent.; pyridine bases, ¼ per cent.; methyl violet, ¼ per cent. of a solution.

(*n*) In Germany, while the alcohol motor has been established for years, especially for agricultural engines, it has not been used for motor cars, because the best customers are in England and other countries where petrol has been the only fuel used. It would not pay the Germans to manufacture alcohol motor engines for their country alone.

The recommendation of Mr. Neville, Government Chemist, to the effect that experiments with alcohol lamps should be made at various railway stations where electricity is not available, is being acted upon by the General Manager, N.G.R.

Mr. Pay, Inspector of Explosives, has ascertained that there are at least three firms now in Natal manufacturing alcohol, and in his opinion all manufacturers of sugar on a large scale would in all probability manufacture alcohol from molasses.

Mr. Pay also reminds us (1) that the world's petrol supply is fast becoming exhausted; (2) that alcohol is the only fuel with which it will be possible to replace petrol; (3) that Natal is essentially an alcohol-producing country.

Messrs. Hart, Parr & Co., Charles City, Iowa, U.S.A., inform us that they have equipped some of their engines for alcohol, and it is "by far the best fuel they have yet used.".

It is reassuring to learn from Messrs. Crossley Bros., Ltd., Manchester, that they have for several years made engines to work with alcohol, "but chiefly for two or three foreign countries where alcohol is cheap and easily obtainable." This is proof, therefore, if such were wanted, that the selling cost of denatured alcohol is the crux of the whole question.

Mr. E. R. Sawer, Director, Division of Agriculture and Forestry, Cedara, as the result of personally conducted experiments, expresses himself strongly in favour of alcohol as fuel, and remarks, "cost has heretofore been prohibitive." He is prepared to undertake laboratory determinations of the percentages of alcohol obtainable from different crops in Natal. Such should be a valuable guide to those who contemplate taking the matter up.

I would add that Professor Duncan, in an admirably written work entitled "The Chemistry of Commerce," printed in the U.S.A., 1907, gives a chapter on Industrial Alcohol, which I would commend to the attention of farmers, planters, manufacturers and commercial men in Natal. As to cost, he states that denatured alcohol may be produced in America at from 1s. to 1s 3d a gallon, and further that two gallons molasses furnish one gallon alcohol, and a bushel of maize yields about 2·7 gallons (American) of 95 per cent alcohol. In Cuba such alcohol sells at a price of 10 cents (5d.) a gallon. Presumably this refers to pure and not denatured alcohol. He reminds us that the price of gasoline, and therefore of petrol, is sure to rise as the supply diminishes.

For the development of suitable engines we may, in Professor Duncan's opinion, confidently look to the inventive faculties of America now that the Free Alcohol Bill has thrown alcohol open for industrial use.

With respect to Excise Regulations the following quotation should be of interest:—"By the amendment of the Free Alcohol Law (which was expected to take effect on the 1st September, 1907), the manufacture of alcohol will no longer be confined to the industrial distilleries, but just as in Germany, farmers, and communities of farmers, may freely make it for industrial purposes. This they may do by distilling it into sealed tanks in which the alcohol may be denatured on the spot, or which with the contents may be transferred free of tax to central denaturing establishments. In the regulation of this, the Commissioner of Internal Revenue is given a free hand."

Seeing that Germany and America have solved the questions of cost and of excise enabling alcohol to compete with petrol and ordinary paraffin, what is there to prevent Natal or South Africa being equally successful?

Mechanically Propelled Vehicles as Feeders to the N.G.R.

By W. G. KEMP.

[NOTE.—The following article has been sent to us by the writer, Mr. W. G. Kemp, as one that is likely to be of interest to readers of the *Agricultural Journal* in view of the discussion on Mechanical Road Traction which took place at the recent Conference of the Natal Agricultural Union. The article originally appeared in the *South African Railway Magazine*, to the Natal Editor of which we are indebted for the loan of the blocks illustrating the article.—ED.]

THE progressive agricultural and mineral development of Natal is severely handicapped by the lack of cheap efficient transport from outlying districts to the nearest railway station. Vast tracts of fertile virgin soil, at the present time lying idle, if scientically cultivated, would undoubtedly be paying propositions, and offer sound inducement to capitalists for investment, provided that reliable transport could be obtained at reasonable rates to the nearest point of communication with the railways.

One of the principal obstacles to be overcome in the development of the mineral resources of this Colony is the provision and upkeep of a system of transport from the mines to the railways that would be efficient and economical. Not before this difficulty has been overcome can we expect the favourable consideration and support of the money market in mining propositions in Natal, no matter how bright the prospects or alluring the prospectus.

Owing to the ravages of the various animal diseases prevalent throughout the Colony, and the stringent East Coast Fever regulations prohibiting the movement of cattle in certain areas, the use of the primitive mode of transport by oxen so long in vogue, yet so antiquated in this progressive age, is practically prohibited, and as a result the agricultural and mineral development of many promising districts is practically at a standstill. In other districts the only mode of transport to be obtained is by mules; but the condition of the roads, combined with the excessive cost, although compensated to a degree by increased speed, is altogether out of the question where working expenses is a prime factor in the production of dividends to the satisfaction of captious shareholders.

The thought naturally suggests itself that the introduction of





VIEWS OF THE MAIN ROAD, ESHOWE.

(See Article on "Mechanically Propelled Vehicles as Feeders to the N.G.R."

Blocks by Courtesy of "S.A. Railway Magazine."

mechanically propelled vehicles for transport purposes would not only accomplish this end, but should, all things being equal, be attended with the same measure of success as in other countries The question then arises whether the initiative should be taken by the Railway Department or private enterprise. Strictly speaking, and on lines of precedent, it is essentially railway enterprise to spare no effort to attract traffic to its lines and open up new districts, with the aim always in view of tapping fresh sources from which revenue may be derived.

The railways of Natal being controlled by the State and worked for the benefit of the community as a whole, it may therefore be assumed that the initial cost of mechanically-propelled vehicles as feeders to the railway—introduced with a view to opening up new districts for agricultural and mineral development, and to bring outlying districts into direct communication with the railway by means of reliable transport at reasonable rates—should be borne by the State.

With the advance of civilisation, and from a revenue-earning point of view, the days of the transport rider feeding the railways are past. It is in the interests of the community and future prosperity of the Colony (or Province) of Natal that the Railway Department should follow in the steps of the Home railway companies—who have shown a commendable enterprise in this connection—and introduce mechanically-propelled vehicles to carry mails, passengers and baggage, with one or more trailers for the conveyance of goods, and to act as feeders to the railway in districts where the roads are suitable and the construction of expensive branch lines not yet warranted.

The class of cars required for the districts it is decided to exploit by this means of transport is a matter for technical experts to decide after exhaustive inquiries have been made into (*a*) the condition of the roads, gradients, etc.; (*b*) spruits to be negotiated both in dry and wet seasons; (*c*) population (European and native); (*d*) approximate revenue derived from conveyance of passengers, mails, baggage, and goods under the present mode of transport; (*e*) estimated increase in traffic from increased facilities offered by the proposed improved transport for the further development of the agricultural and mineral resources of the district.

The car eventually selected for the work should be provided with a view to coping with the normal increase of traffic during the life of the vehicle due to regular and accelerated service combined with economical rates.

The Albion car shown has every appearance of being a serviceable vehicle for the conveyance of passengers, mails, baggage, and limited quantities of goods. It would be, all things being considered, more adaptable to Colonial requirements if it were treble the horse-power, say, 50 h.p., and capable of hauling one or more trailers for the conveyance of general goods, according to local requirements.

The cost per annum to the Postal Department for post-cart services in the Colony is £7,133, and if the contracts in the districts in which motor transport had been introduced were transferred to the Railway Department, this would subsidise these vehicles in the form of a fixed annual revenue, and would not only ensure a regular service, but should foster lucrative passenger traffic over the railways. The growing tendency of the age is to travel, but the inducement must be that long distances may be covered in "luxurious" ease and comfort without fatigue.

There are two districts that have special claims over all others for consideration, and to which this scheme of transport is applicable, and, theoretically speaking, eminently adaptable, namely, Port Shepstone-Harding, on the South Coast, and Ginginhlovu-Eshowe on the North Coast, for the reason that not only has provision been made in the past for either a continuation of the line or the construction of branch lines through these districts, and which projects, notwitthstanding the importunate demands of the inhabitants, have, through continued depression and diminishing receipts, had to be reluctantly abandoned by the Government, and to all appearances shelved for some considerable time to come.

The Port Shepstone-Harding district (Alfred County) is undoubtedly one of the most promising agricultural districts in Natal, with its extensive wattle plantations, and natural facilities for profitable dairy farming, mealie, tobacco, and fibre cultivation; and there is also the prospect of the exploitation of its mineral resources, principally graphite, in the near future. But at the present time all further progressive development is severely handicapped by inefficient and costly transport to the nearest point of communication with the railways. It is obvious that this district would justify the establishment of mechanical transport, but it must not be overlooked that a considerable expenditure would have to be incurred in improving the roads before mechanical transport would be a practical proposition. From the present mode of transport between Port Shepstone and Harding there is, from available information, derived approximately a revenue of £5,000 per annum, inclusive of the postcart subsidy (£950), which amply demonstrates the urgent need for improved facilities.

Eshowe, the principal town in Zululand, has a population of about 700, is 17 miles from Ginginhlovu, and situated in a district the mineral potentialities of which has not yet been ascertained, and can never be fully exploited until modern transport supersedes the primitive mode in vogue at the present time. This district has everything to commend the adaptation of mechanically-propelled vehicles to local conditions and requirements, and for the further development of its mineral and agricultural resources. Possessing one of the finest metalled road connections with the railway in the Colony, the steepest gradient being 1 in 12 for very short lengths, therefore the ruling grade may be taken as 1

in 15, which is not an insurmountable difficulty to specially constructed cars for the service. There is only one river (Inyezane) to be negotiated, although, without a bridge, the drift is a good one, and notwithstanding an exceptionally wet season (1908-9), it has not been impassable for vehicular traffic during this period of the year.

So far as can be ascertained approximately at the moment, with the present mode of transport there is conveyed annually between Ginginhlovu and Eshowe 1,000 passengers and 1,140 tons of general traffic, yielding an approximate revenue of £3,240, inclusive of the postcart subsidy (£500), and if the cost of transport to Eshowe of 300 passengers and 660 tons of goods for Melmoth and beyond is included (£1,140), this gives a total revenue per annum from this source of £4,640 under existing conditions. All things being considered, there appears to be every inducement to further exhibit that spirit of enterprise which has gradually developed the railway system of Natal from two miles in 1860 to 988 miles in 1909, by introducing mechanical transport to meet the growing requirements of the Colony. The writer has purposely refrained from quoting statistics compiled from the results of the working of these vehicles in the Homeland and elsewhere in support of their utility as feeders to the different railway systems in which they are in vogue, as the conditions under which excellent results have been obtained have no comparison with the difficulties to be overcome ,and distinctly peculiar conditions which obtain in Natal, and cannot therefore be taken into consideration in forming an estimate of the probable results of the working of motor tractors to and from Eshowe, or in any other districts in which they may be introduced.

The foregoing is based more on observation than expert or technical knowledge of the subject, and is put forward through the medium of this *Journal* merely as a suggestion in embryo to arouse interest in a scheme of transport which may possibly play an important part in the near future in connection with the progressive development of the resources of Natal, and will no doubt receive the thoughtful attention of those who take more than a passing interest in the railways and their relationship to the State.

It should be every farmer's ambition to have his farm entirely fenced. It adds greatly to the value of the farm and will add greatly to the peace and comfort of the neighbourhood.

A Preventive for Fowlsickness.

AN interesting theory as to the reason of the prevalence of fowlsickness and other ills affecting our poultry and keeping the industry back has been propounded by Mr. C. Devonshire, in the course of an article in the *South African Poultry Journal* for June 11th. His idea—and it seems a logical one—is that the diseases from which all classes of poultry suffer so heavily at times are due to a deficiency of certain mineral salts in the soil of this country; and he proposes a remedy which is within the reach of everyone to make use of since the ingredients are cheap, and the mixture when made up should not cost more than 3d. to 4d. per pound. Common salt, Epsom salts, sulphur, charcoal and bone, are among the principle constituents of Mr. Devonshire's formula; and whilst many breeders have, of course, been using these substances for years, they have only used them in a tentative way and not as a scientific combination filling an absolute necessity in the fowl's weekly ration.

We reproduce Mr. Devonshire's article herewith in full, and we think no apology is due from us for doing so. Mr. Devonshire, as readers will see, gives his formula, so that everyone is at liberty to give it a trial.

But the theory is of wider application than at first sight appears. During show week in Maritzburg we had the pleasure of a visit from the Editor of the *South African Poultry Journal*, and in discussing this article he pointed out that it was within the bounds of possibility that the supplying of these mineral salts to animals of the bovine species would have the effect of giving the blood of such animals power to retard, if not altogether to prevent, the growth of the East Coast Fever piroplasma upon its entry into the animal organism through the proboscis of the tick. This is an application of Mr. Devonshire's theory which is worthy of investigation; but for the present we leave the matter for the consideration of our readers, both as regards the prevention of poultry diseases, and in its connection with East Coast Fever.

Mr. Devonshire's article is as follows:—

"Many of us keep fowls and keep them successfully, from our own standpoint, which is that they do not die from disease. How many people have said to me, 'I never lose any fowls from sickness.' And so unconsciously the criterion of success with poultry, comes to be limited to this that they do not die from sickness.

"Let us set out with another standard of success, *i.e.*, to produce chickens which will reach the maximum weight in the shortest time at the least expense.

"If such is our motto, we at once perceive that it involves a consideration of the fowl as a purely artificial animal. We keep fowls for profit primarily in most cases and the pleasure is increased in proportion to the profit.

"In this article, I wish to dwell upon one of the principal sources of supply to the fowl of the material for the framework of the body (the nourishment of the bone, that is), and the maintenance of the materials essential to the proper functioning of the blood; the liver, gastric juice, etc., what the Government Chemist of the Transvaal Agriculture Department calls 'the processes of life.'

"We are constantly told that the offspring of imported stock in this country tend to diminish in size, below that of their parents. This is undoubtedly true, but it is more than doubtful whether the contention that this diminution in size must *necessarily* take place as part of the inevitable result of growing fowls in this country, is equally true. Personally, I am satisfied that the loss of size and general tendency to deterioration is due to preventible causes. *Prima facie*, birds bred in this beautiful dry climate should tend to increase in size over that of their parents.

"We must conclude, therefore, that there is probably some shortage in the foodstuffs in South Africa, which more than counterbalances the advantages which would otherwise accrue from the climate to the bird.

"Such, in fact, is the case: The writer has bred between 4,000 and 5,000 birds (chicks and ducklings) since the war, either in the O.R.C. or Transvaal, and the evidence is overwhelming, and is conceded to be such by the Government experts, that of themselves, our foodstuffs are not of the same feeding value as the corresponding foodstuffs in Europe.

"There is something missing. What is it? Let us take a practical example. Let us burn 100 lbs. of lucerne, and we shall find that there remains some 6 or 8 lbs. of material which will not burn. This is known as the 'ash' in the foodstuffs. It is roughly composed of 8 materials in combination—known, I believe, to chemists as 'salts,' although to us laymen that word 'salts' suggests a more limited, not to say disagreeable, application.

"The importance of these salts or ash in the foodstuffs as regards the part which they play in enabling the body to functionate properly has been overlooked.

"I remember the late Government Chemist to the Transvaal saying to me that, speaking roughly, 'You may say that nitrogenous matter (such as blood, meat, etc., in animal food, and the proteins in grains), compose the body, *i.e.*, the machinery—the fats (largely found in mealies and present in all foods) supply the fuel to drive the machinery, while the mineral ash represents the few drops of oil without which the machinery will not work.' Nine-tenths of our trouble with our poultry consists in this that these few drops of oil are deficient in amount—hence the tendency to loss of size, liability to liver disease, general debility, and a fatal facility for contracting catarrh, diarrhœa, roup, etc.

"'The processes of life' are dependant for their maintenance, not

upon the proteins, carbohydrates or fats in the food given, but upon the mineral ash or salts found in that food.

"As we have said, experience, which is our best guide, tells the practical poultryman that for reasons which need not be discussed here the supply of the mineral ash to his fowls is in the vast majority of cases inadequate.

"As practical men, we need not trouble to inquire the scientific why and wherefore of everything—all we need to know is this:—Does the artificial addition of these 'salts' to the ration of our birds produce results which are sufficiently pronounced to justify us as practical men in believing that we have discovered the chief cause of our troubles with the poultry?

"The writer bred 1,100 birds last year at Barberton, Transvaal, *i.e.*, some 600 ducklings and 500 chickens. These salts were supplied to chicks and ducklings alike. The parent stock consisted of 70 common hens and 20 common ducks. One 200-egg Petaluma Incubator was used and one 50-egg ditto. A brooder house of reeds and an incubator house of the same material comprised the plant. The results justify us in asserting that poultry in this climate, if supplied with the missing material, tend to increase in size over that of their parents.

"We now have some data on which to work as to what weights our chicks should reach at any given age. If we can get our pure bred Wyandottes, Orpingtons, or Barred Rocks to scale ¾ lb. at six weeks old, we should have done very well. So again, a common or puddle duckling which weighs 4 lbs. at nine weeks is an excellent result to obtain for the majority of busy farmer's wives.

"To produce these results, it is essential to reinforce the supply of mineral salts which are naturally available to the bird in the foodstuffs given.

"We have pleasure in placing at the disposal of our fellow-poultrymen the formula which we have used with such remarkable results for over two years.

THE FORMULA.

	Parts.
Common Salt	30
Phosphates of Soda	9
Calcium Fluoride	1
Ferrous Sulphate (Green Vitriol)	1
Bone Ash	30
Chalk	14
Epsom Salts	10
Charcoal	2
Sulphur (Flowers of)	3
	—100

Give one tablespoonful twice a week in every 5 or 6 lbs of bran and mealie meal (use two parts bran and one mealie meal).

We unhesitatingly affirm that in the vast majority of cases fowl-sickness, so called, is due to a prolonged starvation by the fowl of the above salts.

"Try it and see for yourself, my fellow poultrymen."

Pineapple Cultivation.

By H. C. HENDRIKSEN and M. J. LORNS, *Horticulturists, Porto Rico Agricultural Experiment Station.*

(*Continued from Page 740, Vol. XII.*)

METHODS OF PLANTING.

THE methods of planting now followed range from single rows, 6 feet apart, planted on a ridge, to 20 or more rows, 15 to 18 inches apart, planted on level ground. All of the methods have strong advocates, and it is simply a question of which method is best adapted to certain fields, considering all of the factors that can enter into the discussion. Let us first consider a sandy soil, well drained and free from joint grasses. If the sand is comparatively coarse, the ground water not within 2 feet of the surface, and the lay of the land such that the surface water can drain off quickly, the problem is very simple. Such land should without question be planted in wide, level beds.

If the sand is fine and the drainage not perfect, the soil should be bedded up. The height and width of the beds will depend entirely on local conditions. If there are no noxious weeds to combat, the beds should be as wide as it would be possible to make them and not higher than absolutely necessary to insure good drainage.

In loam and clay soils the considerations are: To keep the soil aerated, to get rid of an overabundance of water in the shortest possible time, to be able to keep the soil free from weeds, and to prevent the fruit as well as the plants and suckers from falling over.

THE SINGLE-ROW SYSTEM.

In the single-row method the plants are set from 12 to 22 inches apart in rows from 2 to 6 feet apart. The beds are usually made by ploughing two furrows together, and practically no hand work is needed. This system is not well adapted to sandy soils because they dry out too quickly; neither is it well adapted to heavy clay soils for the same reason, unless the beds are made wider. In a friable loam there seems to be no objection to one row in a narrow bed, as far as the soil is concerned. If the rows are far enough apart the system has the advantage of easier cultivation, which may to some extent be done with a horse cultivator; on the other hand, there are larger vacant spaces which it is necessary to cultivate to keep clean. If the land is full of joint grasses the one-row system is well adapted, because it is possible to enter the beds and weed, while in the wider beds this is practically impossible.

The great objection to the one-row system is that as soon as the fruit attains any considerable size it does not remain in an upright position, and when, in leaning to one side, it does not receive support from neighbouring plants it bends further, until it reaches the ground. In that position it is subject to sun scald on the upper side, and will be unfit for shipment. Also, after harvesting the fruit, the suckers left on the plant are liable to be blown off, and, even if they remain in an upright position until fruiting, the weight of the fruit is almost sure to bend them down. Such beds, therefore, should not be continued except by leaving the ratoons and the very lowest suckers or else replanting.

THE DOUBLE-ROW SYSTEM.

For double rows the beds are laid off by ploughing several furrows together and using some hand work in finishing off. The plants are set from 12 to 22 inches apart each way, leaving a margin of 6 inches or more on each side of the bed. This system can be used in any kind of soil. It has practically all of the advantages of the one-row system and the disadvantage of plants and fruit falling over is greatly reduced, although it leaves considerable to be desired in that respect. In soils that are inclined to be weedy the two-row system is preferred to any other, but in comparatively clean soil, and especially those containing no joint grasses, beds wide enough to plant from three to six rows of pines are preferable.

THE THREE TO SIX ROW SYSTEM.

In making beds for the three to six-row system the same method can be used as for the one and the two-row beds, but considerable hand work is needed besides. It is good practice to leave a space of 6 feet between the beds, which should be excavatd so as to leave the top of the beds at least 12 inches above the bottom of the walk between the beds. If the plants are set 15 inches apart and six rows to the bed it would require beds fully 7 feet wide. This is not too wide for working easily, provided the land is not weedy, while it almost completely eliminates the falling over of plants and fruit. It has been found, however, that where the soil is not physically well suited to pineapples the rows in the middle of the bed do not produce as well as those on the outside, and one should therefore carefully consider the conditions before laying off the beds by this method.

THE WIDE-BED SYSTEM.

In the method known as the "wide-bed system," the land is marked off with the rows about 18 inches apart and the plants set in perfectly straight lines, which may be as long as the field, but for the sake of



Cabezona Pin apples on Station Grounds. Three-rowe l Syste n of Planting.



Pineapples and Oranges, Vega Baja.

PINEAPPLE CULTIVATION
(See Article.)

passing through the field there ought to be a roadway of 8 feet for every 200 feet of bed. The width of the bed is made 30 to 50 feet, according to the distance a man can throw a pineapple. In harvesting the fruit one man goes into the bed and breaks off the fruit and throws it to a man in the roadway, who catches it and places it in baskets or boxes, which are then hauled to the packing houses. In practice, beds 30 feet wide with roadways 8 feet wide, together with crossroads every 200 feet, make a very convenient field.

PREPARING THE PLANTS.

The young plants, whether suckers, slips, or crown, are covered with leaves to the very tip of the base. In stripping these leaves off and exposing the stem a number of excrescences will be seen, which are the root buds, some of which may be already developed into roots of considerable length. Many planters maintain that it is necessary to trim the plants—that is, to cut the tip of the base and to strip the leaves off for a distance of 1 to 2 inches. Other planters maintain that this process is not at all necessary. Why is this? The reason is simply the difference in local conditions under which the plants are grown. If a slip is planted without trimming in a dry, sandy soil, the roots will form, but instead of spreading out in the normal fashion they will wind around the stem under the leaves. There are two reasons for this; one is that on account of the dry soil the leaves covering the stem remain hard and dry and the roots would have to overcome great resistance in order to penetrate them; they therefore follow the course of least resistance and develop under the leaves. The other reason is that the plant catches a great deal of dew and water from light rains, which is retained in the heart and leaf axils, from which it trickles down around the base and makes the condition there favourable for root formation, while at a distance of an inch or more from the stem the soil is drier. This growing of the roots around the stem is called in Florida "tangle-root," and there plants are trimmed in order to insure the desired root development. If the plants are set in a loamy or clay soil that contains considerable moisture, the leaves covered up with soil will decay in a short time, and as the soil is as moist a distance away from the plant as close by the roots will spread out just as well as if the plants had been trimmed. Therefore for planting in a dry soil or in a dry season, trim, but for planting in a moist soil or in the rainy season the work is not worth the cost.

The trimming consists in cutting off the base and stripping off the lower leaves, leaving an inch or more of the stem exposed. If large suckers are planted it is quite common to cut the ends of the leaves off, but this not desirable, because cutting or breaking the leaves lowers the vitality of the plant.

PLANTING THE FIELD.

The beds being prepared according to the desired system of culture, the rows can be marked off either with an ordinary marker or with a line, but whichever method is used the rows should be straight. The distance between the rows, as well as between the plants, will vary according to the variety and also according to the soil and the system of planting. Pineapples, no matter what variety, do not have an extensive root system, and when planted in single rows 12 to 15 inches apart they have enough room for root development. In beds with several rows, 15 to 18 inches for Spanish and other small varieties and 24 inches for Cabezona and other large varieties is space enough. Under no circumstances should pineapple plants be set over 24 to 30 inches apart in the row, because it is waste of land, it leaves too much soil uncovered, and increases the work of weeding, while it gives no support for the plants and the fruit.

In planting it is a good plan for one man to drop the plants the desired distance apart and another man to follow with a blunt dibble with which to make holes 1½ to 3 inches deep, according to the size of the plants. The base of the plant is inserted into the hole and the soil pressed firmly down with the dibble and with the foot.

The number of plants per acre will differ, depending on the system of planting adopted. The following table gives the approximate number of plants per acre for the different systems of planting:—

APPROXIMATE NUMBER OF PLANTS PER ACRE.

System of Planting.	Varieties.	Distance apart of plants in rows.	Width of paths between banks.			
			3 feet.	4 feet.	5 feet.	6 feet.
		Inches.				
Single row ...	Small ..	12	14,520	10,890	8,712	7,260
	Large ...	15	11,616	8,712	6,969	5,808
Double rows ...	Small ...	12 by 12	21,780	17,424	14,520	12,446
	Large ...	15 by 15	16,366	13,282	11,022	9,504
Three rows ...	Small ...	15 by 15	19,038	16,032	13,926	12,324
	Large ...	18 by 18	14,520	12,445	10,890	9,379
Four rows ...	Small ...	18 by 18	15,488	13,620	12,232	11,120
	Large ...	24 by 24	9,689	8,712	7,920	7,260
Five rows ...	Small ...	18 by 18	16,133	14,520	13,200	12,100
	Large ...	24 by 24	9 900	9,075	8,377	7,778
Six rows ..	Small ...	18 by 18	16,594	15,151	13,939	12,906
	Large ...	24 by 24	10,050	9,334	8,712	8,166
Thirty rows ...	Small ...	18 by 18	18,639	18,639	17,889	17,514
	Large ...	24 by 24	10,710	10,539	10,371	10,209

HOW THE PINEAPPLE PLANT GROWS.

If the soil in which the pineapple plant has been set is moist, root development will take place at once and the roots will be able to take up the food elements as soon as needed. These elements in solution are carried through the roots up to the stem and to the leaves. In the leaf cells, by action of the sun and the green colouring matter which we call "chlorophyl," these food elements from the soil and carbon dioxid from the air are combined with water into food for the plant in ways not yet fully understood. This food consists of many complex chemical compounds, the best known of which are the sugars and starches. From the leaves the food is carried in solution to all parts of the plant wherever needed. Both sunshine and chlorophyl are necessary to the formation of the principal food, so that a leaf losing its colour loses its power to form food. It is thus seen how important a large, healthy leaf is to the formation of a good fruit.

Food not needed immediately is stored up in the plant tissues, usually in the form of starch, and it is this reserve supply that carries the plant over periods of hardship and vitally enters into the formation of extra-grade fruits. It is probably due to this that, as a rule, the pineapple plants that have a longer period for development will give larger fruit. They have, as it were, more accumulated reserve energy to use in the severe strain of fruit producing.

The root system of the pineapple is shallow and usually does not extend much over 6 inches in each direction. Among the larger varieties it is not uncommon to find a few roots extending 10 to 12 inches from the stem, but the main portions are matted closely together within a distance of from 4 to 6 inches.

The development of the root system is of great importance in considering planting, cultivating, and fertilising. It will be readily understood that the plants can be set as close as 12 inches apart without the roots interfering. It will also be seen that cultivation must necessarily be shallow, especially close to the plants, and in fertilising it would be a waste to spread the fertiliser in the middles, where the rows are 3 feet or more apart.

Where small slips are set in sandy soil it is not unusual to find them filled with sand, especially after a heavy rain or wind. This is detrimental to the plant, and the sand should be washed out by pouring water directly into the heart from a sprinkling can with the rose removed. It may also be prevented by dropping a pinch of cotton-seed meal, dried blood, or tobacco dust, or a mixture of any of these materials, into the heart immediately after planting. This, by filling the cavity, will prevent the sand from entering, yet, unlike the sand, it will not choke the plant.

CULTIVATION.

On account of the shallow root growth and the close planting, cultivation is confined almost entirely to hard work. With the single-row or narrow-bed system some horse work can be done the first season, but after that the leaves interlace and with horse culitvation more or less damage is caused by breaking and tearing the leaves. The extent of the damage compared with the difference in the cost of cultivating will naturally determine the best method to be employed, but some hard work will always be necessary. On the sandy soil in Florida the scuffe hoe is generally used, but on the heavier soils in the West Indies it is necessary to use the ordinary hand hoe, not alone on account of the heavier soil, but also because of the much more abundant growth of weeds. Wherever the land is weedy, cultivation should be strictly attended to, because a crop of weeds is detrimental to the growth of the pineapple plant; and if left to grow, large weeds are much more difficult to eradicate than if attended to in time.

Fix up the farmstead. It makes a living for you and is entitled to your utmost care and respect.

Let the pigs eat all they want but be sure to allow them plenty of room for exercise. If they prefer to lie in their bed turn them out of the pen and fasten the door.

Underdrains prevent the interstices of the soil from becoming blocked or filled with fine particles of earth held in suspension; that is, they prevent puddling, to some extent. Clayey soils shrink if they become dry, and swell when they are wet. Underdrains tend to prevent the swelling and closing of the pores which have been produced by drying. As soon as air is admitted to the subsoil, the dead roots of plants are decomposed and minute drainage channels are formed. One of the effects of drainage is to produce many small channels in the soil, which prevent the formation of large cracks that admit the air too freely and thereby cause excessive evaporation. Underdrains promote fertility by opening up the soil to the oxidising action of the air, and by making the soil more comfortable for the nitrifying organisms.—*Prof. J. P. Roberts* (*"The Fertility of the Land."*)

Agricultural and Rural Associations.

FIRST INTERNATIONAL CONGRESS, 1910.

Members of agricultural associations and similar bodies will be interested to know that an International Congress of Agricultural Associations and Rural Demography is to be held in Brussels in September, 1910, on the occasion of the Universal Exhibition there; and since the members of some of our leading societies may be visiting Europe about that time, and be willing to act as delegates from their societies, we publish the following particulars of the Congress.

The Congress will be under the presidency of M. le Baron de Moreau, President du Conseil Superieur d'Agriculture and some time Minister of Agriculture of France, M. Tibbaut, Membre de la Chambre des Representants, and M. Callier, President de la Societe Royale d'Agriculture de Gand. The aim of the Congress will be to get, in brief reports, "an exact description of the different types of rural associations throughout the whole world, the advantages and disadvantages of which could be studied from all points of view by the persons most competent to give an opinion." The Congress will also aim at studying other important means for improving the conditions of the cultivator, as, for instance, the improvement of public health, the improvement of roads, the reduction of agricultural labour, etc.—questions which have not yet been sufficiently studied in International Congresses. The Congress has no intention whatever of encroaching on the domain of general congresses on such subjects as agriculture, agricultural education, botany, horticulture, the dairy industry, etc. Such congresses treat all these questions from a technical and economic point of view. This one will approach them only from their social side.

To sum up, the Brussels Congress will examine all associations from the point of view of their organisation and progress, without entering into technical details. For the rest, it will confine itself to the study of the influence of these associations on the improvement of the lot of the agriculturist and farmer generally.

The following are the articles governing the constitution of the Association:—

(1) An International Congress for Agricultural Associations and Rural Demography will be held at Brussels in September, 1910, on the occasion of the Universal Exhibition.

(2) The Congress will consist of ten sections in conformity with the programme annexed to the statutes.

(3) Societies and persons may become active members by sending in a subscription amounting to 15 francs to the Organising Committee (Secretary, 220, Chaussee d'Almsberg, Bruxelles).

Administrations, agricultural and horticultural societies, and all bodies having for their object the improvement of agriculture in its widest meaning can take part in the Congress and send delegates. Payment should be made at the rate of one subscription for each delegate.

Persons, associations, etc., who subscribe at least 100 francs have the title of "membres donateurs."

The list of such members will be published.

(4) The Congress will be governed by an Organising Committee composed of the presidents and secretaries of the sections.

The executive of this committee constitutes the executive of the Congress. It is charged with the duty of taking all requisite measures for the preparation and arrangement of the Congress, and with deciding all cases not provided for in the regulations.

The executive of each section will take all necessary measures for carrying out its own programme.

(5) An International Committee will be formed in each country for the purpose of securing members and drafting reports. These committees will supervise the collection of their own funds for propagandist work. Should the funds be insufficient they are allowed to defray their expenses from the subscriptions they receive. These expenses should not exceed 10 per cent. of the subscriptions. Each committee appoints a president, a treasurer, and a secretary. As soon as a group of persons interested in the success of the Congress is formed it may be appointed by the executive to act as a special Propagandist Committee, etc. These committees may be subdivided into sections corresponding to the sections of the Congress.

(7) Papers and discussions may be written in French, German, or English. Other languages are also admitted. But each report must be accompanied by a summary in French, and speakers are required to give to the sectional officer the French summary of their speeches.

(8) Papers should be confined to a short statement of the subject with a special view to the practical means of application and close with a statement or resolution to be submitted to the Congress. Papers may no exceed five pages in octave (of about 40 lines of 10 words).

Communications not intended for discussion may be annexed to the minutes when not exceeding two pages. Papers and communications should give the principal bibliographical information on the question under discussion.

Authors are requested to keep the original manuscript of their papers and to send in a legible copy, if possible, typewritten.

(9) The Executive of the Congress will decide what papers and communications shall be admitted. When many papers deal with the same subject a general reporter may be appointed for this question. Papers not directly concerning the programme will be strictly excluded.

(10) All discussions on the basis of political, philosophical, or religious questions are forbidden.

(11) Papers intended to be printed in advance must be sent to the International Congress office before 1st February, 1910. Papers forwarded after this date may be read or abstracted and inserted on the proceedings. The copyright in papers and discussions belongs to the Congress. The executives reserve to themselves the right of publishing them in extenso or in abstract.

(12) Resolutions adopted by the sections are submitted for ratification at the Congress. They will be accepted or rejected without discussion on their merits. No request for discussions at the general assembly of Congress is allowed. Orders of procedure for the sittings of the Congress and other questions will be published eventually.

Programme of the Congress.

The discussions of the Congress are to be divided under ten heads, which, with their sub-heads, are as follows:—

Section I.—Associations for study, general interest and protection of the trade interests of cultivators:—(1) Federations of agricultural and horticultural societies; (2) central and national societies; (3) official representation of agriculture, horticulture, etc.; (4) various societies.

Section II.—Associations for study and protection of the trade interests of women engaged in agriculture:—(1) Federations; (2) leagues for study, farmers' wive's institutes; (3) societies for agriculture and horticulture; (4) professional syndicates; (5) various associations.

Section III.—Associations for planitng and cattle-breeding:—(1) Associations for plant breeding, seed selection, etc.; (2) associations for cattle breeding; (3) associations for breeding minor stock; (4) associations for inspection; (5) various associations.

Section IV.—Associations for manufacture, exportation, sale, etc.:—(1) Associations for dealing with agricultural produce; (2) associations of dairies, cheese factories, etc.; (3) associations for manufacture of preserves; (4) associations for purchase; (5) associations for exportation; (6) associations for preservation of produce, cold storage, etc.; (7) associations for sale; (8) associations for general use; (9) various.

Section V.—Associations for thrift, loan, and insurance:—(1) Associations for thrift; (2) credit banks; (3) associations for cattle insurance; (4) associations for insurance of minor stock; (5) various.

Section VI.—Demography and hygiene:—(1) Birth, marriage and death rate; (2) hygiene of clothes; (3) hygiene of food; (4) hygiene of dwellings; (5) societies for diffusion of principles of hgyiene; (6) societies for encouraging the building of houses in the country.

Section VII.—Agricultural labour:—(1) Leagues for the protection of agricultural labour; (2) agricultural labour exchanges; (3) conveyance of agricultural workmen; (4) reduction of labour by agricultural engines; (5) mobility of agricultural labour. Emigration; (6) home industries in agriculture.

Section VIII.—Means of conveyance in agriculture:—(1) Agricultural roads—their construction; (2) the creation and straightening and public acquisition; (3) communications between rural properties; (4) leagues for the improvements of roads; (5) other means of transport.

Section IX.—Other measures aiming at the improvement of the lot of cultivators:—(1) Societies for the well-being of cultivators, and against rural depopulation; (2) æsthetic of the farm and the village; (3) water distribution; (4) public lighting; (5) popular games.—Pleasure societies. Popular songs and feasts; (6) diffusion of small holdings. Acquisition of estates to be retailed; (7) construction of rural dwellings; (8) vegetable and fruit culture for workmen.

Section X.—Documents, intelligence, exhibitions:—(1) Organisation of the publication office; (2) organisation of intelligence departments by agricultural associations; (3) organisation of enquiries; (4) organisation of special lectures on rural associations; (5) organisation or exhibitions of agricultural associations; (6) organisation of the press of agricultural associations (central translation office, etc.)

If you are in doubt as to which are the most unprofitable ewes in your flock, consult the lambs. The lamb is the ewe's passport, and if the passport is not good the ewe's character should be looked into.

Milch cows should always have plenty of pure water to drink. The best water comes from a good well with the surroundings clean and right. A clear running stream that is not contaminated is all right. Ponds usually become foul and stagnant, and very unfit for cows to drink from.



MAIN ROAD, PORT SHEPSTONE.

(See Article on " Mechanically Propelled Vehicles as Feeders to the N.G.R.")

Blocks by Courtesy of " S.A. Railway Magazine."

Waste Wood and Its Utilisation.

SOME NOTES ON WOOD DISTILLATION.

WHAT MIGHT BE DONE WITH OUR WATTLE WOOD.

In our issue of December, 1907 (pages 1,532-1,537), we published two articles on the question of the utilisation of some portion of the large quantities of wattle wood which are practically wasted every year on our plantations for the distilling therefrom of methyl alcohol, acetates, acetone, turpentine, wood oil, oxalic acid, etc. One of these articles was from the pen of Lt.-Col. Leuchars, and excited much interest at the time. Though interest has waned somewhat, the possibilities before us in the distilling of wattle wood are still with us, and consequently every contribution to our knowledge of what can be done with all this waste wood is welcome. Such a contribution—and one that is particularly valuable, coming from an authoritative source—we have before us in the form of an interesting article on the "Utilisation of Waste Wood" in the last number, just to hand, of the *Bulletin* of the Imperial Institute, London, which has been prepared with a view to affording general information in reply to inquiries that are from time to time received at the Institute as to the possibility of utilising waste wood. We accordingly reproduce herewith the useful information contained in the article, which we think will be read with interest by all persons concerned in the growing of wattle bark.

It is stated, at the outset, that, apart from its use for structural purposes, there are two main ways in which wood can be utilised at present, *viz.*, in the manufacture of wood pulp for paper-making, and by destructive distillation for the production of wood spirit, Stockholm tar and wood charcoal. For these purposes the cheaper woods are available, and for destructive distillation especially the waste products of the various timber industries are suitable.

Much of the wood refuse generally available, such as shavings, sawduct, chips,, spent dye and tan woods, etc., is at present used as fuel, its value for this purpose being a few shillings per ton. In considering the disposal of such material it is important to ascertain whether local conditions will permit of the disposal of the products of distillation at a higher rate than would be obtained for the raw material as fuel. Indeed, in undeveloped communities where wood spirit, tar and charcoal are not saleable in large quantities, the destructive distillation of wood refuse is not likely to be remunerative or even feasible.

From air-dried wood about one-third of its weight of charcoal can

as a rule be obtained, this having an average value of from 17s to 22s. per ton in districts where coal is not readily obtainable. Thus, from one ton of air-dried wood refuse, containing from 20 to 25 per cent. of water, and consequently worth from 4s to 5s., the value of the charcoal would be about 6s. In most countries there is little difficulty in disposing of the charcoal, as its uses are numerous. Besides being largely employed in the manufacture of iron and steel and in the extraction of other metals, such as copper and tin, it can be used in sugar refineries for filtration and for various domestic purposes. Special uses for the "small" charcoal obtained by distilling wood refuse are found in the manufacture of certain kinds of "smokeless" fuels, calcium carbide, and for packing cold storage chambers.

Wood refuse can be carbonised more rapidly and at a lower final temperature than blocks of wood, a temperature of only 300 degs. C. being adequate. One result of this is that the pyroligneous acid obtained in the distillate is of good quality, and fairly readily purified to yield acetic acid. Wood refuse is also more readily dried by exposure to the air, and does not require to be stored for a year or two before its content of water is reduced to from 20 to 25 per cent., which gives the best results as is the case with blocks of freshly-cut wood.

Destructive Distillation of Wood.

In the destructive distillation of wood the blocks or refuse are heated in a suitable vessel provided with a small aperture fitted with a pipe. In modern practice the carbonising vessel is generally a cylindrical wrought-iron retort built into brick-work in a horizontal position. The retorts are of an average size of 3 metres long by 1 metre in diameter, and are made to hold anything up to about 4 tons of wood (a quarter of a "cord"). They are generally set up in "batteries" of two, and heated by the same fire from below. The naked flame is not allowed to impinge directly on the iron retorts, which are heated only by the hot furnace gases, this result being obtained by utilising iron or brick shields or arches. Before the application of heat all the orifices and connections are plugged with clay. The batteries of retorts are set up in rows, and the exit of each retort is connected with a worm condenser made of copper, and cooled externally by means of running water.

When the wood to be distilled is sawdust or scraps of very small size, such as spent tanning materials, dye woods, etc., it is generally advisable to have the plant arranged in a special manner owing to the necessity of having the wood quite dry. This result is frequently obtained by building the retorts in such a manner that the hot gases from the one distillation are used to dry the wood refuse ready packed in another retort. The retorts are also sometimes made on a rotary system to facilitate even drying, and thus prevent unequal carbonisation.

A special form of kiln is said to be adopted on many of the large wood-distillation plants in Sweden, capable of treating wood in all conditions—sodden forest timbers, saw-mill waste and ordinary air-dried logs. The general arrangement of the furnace is in the form of a long tunnel through which pass open steel cars, on which the wood is vertically stacked. The cars are taken through the furnace at an average rate of 22 per diem for perfectly wet wood, and about 36 per diem for air-dried timber. Uncondensed gases from the distillation are returned to the furnace and burnt, thus practically dispensing with the addition of any further fuel.

On the application of heat to the retort the substance of the wood is charred with the formation of volatile products, which are driven off. Those which are condensable are liquefied again in the condensers, and collected in suitable receivers.

Products of Distillation.

Although the process of distillation is practically identical whatever the kind of wood employed, the products obtained are different according to whether "hard" or "soft" wood is used.

Products from Hard Wood.—Most of the wood distilled is hard, such as beech, birch, maple, etc., and is practically free from resinous constituents. Four chief products are obtained, *viz.*: (1) An inflammable gas, which escapes from the condenser, and should, if possible, be returned to the fire to aid in heating the retorts; (2) A watery liquid known as "pryoligneous acid"; (3) Wood tar which is condensed with the pyroligneous acid; and (4) Charcoal, which remains behind in the retorts.

The tar itself may be used as fuel to create the heat necessary for distillation, and in this case it is sprayed with a jet of steam and used in a similar manner to "oil fuel." In this manner the use of coal as fuel may be avoided completely.

The charcoal is allowed to cool for a day or two, either before removal or in specially-devised "cooling chambers" out of contact with the air, or else it is drenched with water immediately after extraction from the retorts to prevent its spontaneous combustion in the air and consequent loss.

Purification of the Products.—The tar and the reddish-brown pyroligneous acid are run off together into large settling vats, where separation is effected by the tar collecting at the bottom. Each is then distilled separately. As the tar and the pyroligneous acid are to a certain extent mutually soluble, the residue from the latter contains a quantity of tar, and the distillate from the former is distinctly acid in character. If the tar is to be utilised as fuel the acid is removed by passing the acid tar downwards over "bafflers," where it is met by an upward current of steam or vapours from the stills, to which the pyroligneous acid is given

up. The chief products obtained by distilling the wood tar (which is itself an article of commerce) are light and heavy wood oils, wood creosote and the well-known product wood pitch, which is left behind in the stills.

In the most modern treatment of the pyroligneous acid an arrangement of plant known as the "three-still" system is adopted. In the first and largest still the crude acid is heated, whereby the volatile acetic acid and "wood spirit" are driven off, and most of the dissolved tar is left behind. The outlet pipe carries the vapours into the second still, and passes them through a thin cream of lime and water. This absorbs the acetic acid with the production of calcium acetate, but does not affect the wood spirit, which passes on and is treated afresh in the third still in order to remove the last traces of acetic acid. In this manner the distillate eventually obtained is free from acid, and by suitable rectification can be made to yield pure methyl alcohol, commercial wood spirit and wood naphtha. The thin paste of calcium acetate remaining in the stills is run out and concentrated in large iron pans until it contains about 84 per cent. of "acetate of lime." This is the product which comes on the market as "grey acetate of lime."

Application of the Products.—The uses of charcoal have been enumerated above. Most of the acetate of lime is subjected to dry distillation, and is thus converted into acetone and calcium carbonate (chalk). The increasing consumption of acetone in chemical industries has rendered this process one of considerable importance. Besides being a useful solvent for varnish resins, acetone is largely used in the manufacture of smokeless explosives and celluloid articles, and its use will very probably be greatly extended in the near future. The present price of acetone is about £60 per ton, and it takes about 40 tons of wood to produce one ton of acetone. The by-products in the distillation, the so-called "acetone oils," are also useful as "paint removers." Their formation is due to the presence in the pyroligneous acid of organic acids higher than acetic acid. Pure acetic acid is also prepared from the acetate of lime by distilling it with sulphuric acid.

Wood alcohol is used very largely for technical purposes. It is a useful solvent, and is widely applied for producing formaldehyde, for "denaturing" ordinary alcohol, and in the coaltar dye industry.

Products from Soft Wood.

When "soft" woods, *i.e.*, resinous woods, such as those obtained from the various pines, are destructively distilled, the substances obtained are as follows:—(1) Inflammable gas; (2) light oils; (3) pyroligneous acid; (4) tar; (5) charcoal. The pyroligneous acid so manufactured is inferior in quality to that afforded by hard woods. The principal fraction is the "light oil," which is usually collected in two portions, of which

the lower boiling one is a kind of crude turpentine oil. This is a dark red oil of unpleasant odour, but after suitable treatment and fractionation it yields a nearly colourless spirit of characteristic odour, which is used as a substitute for ordinary turpentine oil. Compare this *Bulletin*, 1906, 4. 215.) The best yields of products in this process are obtained from the heart wood.

Steam Distillation of Wood.

Besides the method of destructive distillation described above, a process of distillation with steam is gradually finding extended use for obtaining valuable products from waste pine wood. This process only occasions the separation of volatile products (turpentine oil) already pre-existent in the wood.

Pine-tree stumps, saw-mill waste, and sometimes pine timber itself, are cut into chips and placed in a vertical retort fitted with a steam injection pipe. Through this pipe saturated or superheated steam is blown in, and turpentine oil, which is readily volatised, passes out of the retort and collects with the water in a receiver, where it may be readily separated.

The residual wood, after drying a short time in the air, is suitable for fuel. The crude turpentine is rectified from a copper still, and yields a slightly yellow spirit of an agreeable odour which is readily saleable at a price slightly below that of ordinary turpentine oil.

Electrical Process for the Distillation of Wood.

It is stated that a new electric process has been evolved recently in British Columbia for the utilisation of waste wood, and that the process combines destructive distillation with a primary distillation of the free turpentine oil contained in the wood. An experimental plant has been set up at Vancouver, B.C., where waste fir wood is obtainable from local saw-mills, and the electricity from water-power at a low cost.

The wood is filled into oblong cans constructed to fit into special retorts, the brickwork of which is permeated with wrought-iron strips, through which passes a current of 110 volts. The temperature of the vessel, as measured by direct-reading pyrometers, rises from 75 degs. C. at the start to 130 degs. C., when turpentine oil begins to volatilise. The current is then shut off, radiation from the brickwork sufficing to complete the distillation. By the time the temperature of the can has risen to 150 degs. C. on the outside and 205 degs. in the interior, the turpentine oil has been nearly all removed. It is collected by condensation with cold water as in the ordinary process. The rosin contained in the wood melts and runs down to the bottom of the vessel and out through perforations, and is collected in the bottom of the retort.

The can containing the wood is now removed from the turpentine oil

retort into an adjoining still, where the heating is continued and the wood residuum is destructively distilled as previously described. In this way the fresh set of products, charcoal, wood-tar, etc., is obtained quite separate from the turpentine oil and rosin of the first distillation.

It is stated that by this process the following yields are obtained per 1,000 lb. of wood from British Columbia coast fir:—

Turpentine Oil	6·7 galls.
Rosin	168·0 lb.
Tar Oil	5·1 galls.
Tar	68 0 lb.
Charcoal	323·0 galls.

The charcoal obtained is said to be of good quality, tough, and suitable for special purposes.

WHERE DISTILLATION IS CARRIED ON.

Owing to the absence of cheap supplies of raw material, wood distillation is not widely practised in the United Kingdom, but the distillation of sawdust, scrap-wood, spent tan and similar materials is carried on to a small extent.

In many of the Colonies and Dependencies large tracts of forest exist frequently containing trees of little value as timber, and these might well be used in this way, where the products of distillation, and especially the charcoal, are marketable locally. In Canada wood distillation is greatly on the increase owing to developments in the consumption of charcoal.

In Natal attention has been directed recently to the possibility of using wattle timber for destructive distillation after the valuable tanning bark has been removed.* At present this timber is used for pit props and in other ways, but the demand for it is said to be much below the supply.

Wood distillation has been undertaken recently in Victoria, Australia, and a large works has been opened near Warburton, drawing its supplies from the forests of Gippsland.

In India also there would appear to be a possibility of extending this industry. Owing to the religious prejudices of the natives it is necessary to use only wood charcoal in the refining of sugar intended for native consumption. This and the common practice of covering "godowns" with tar-impregnated felt opens out in India a market for two of the chief products of wood distillation.

* See article in the December, 1907, issue of the *Agricultural Journal*, referred to at the beginning of the present article.—ED., *N.A.J.*

The Study of Poultry Foods.

THEIR COMPOSITION AND RELATIVE VALUES.

Very few poultry keepers undertake the study of the feeding values and compounds of the various poultry foods. These persons omit one of the most, if not the most, important element to successful feeding. Ignorance of the feeding values of poultry foods, we are told by Mr. W. Powell Owen, writing in the *Rural Californian,* is nearly always the cause of scarcity of eggs; and in order to put poultry keepers on the right track he discusses the various food compounds, and the proportions in which they should be used in order to obtain the best results.

The food compounds, Mr. Owen reminds us, are five in number:—

Water.—A considerable amount of water is to be found in all foodstuffs, no matter how dry they may seem. Grains and dried meat contain on an average about 10 per cent. of water, raw meats 50 per cent., while some vegetables contain 90 per cent.

Protein.—The term nitrogenous matter and the albuminoids are sometimes used to designate this compound. The protein of food contains nitrogen, and its purpose is to build up and repair the working organs and parts of the body, and to supply material for the production of eggs, feathers, etc. No other food compound can do this.

Fats and Carbohydrates.—These two compounds may be grouped together, since they serve nearly the same purpose. Carbohydrates are heat-producing and fat-forming, and constitute a large part of vegetable foods.

Ash.—The ash of the food is the source of the mineral matter of the animal body, and as such is of importance. Ordinary feeding stuffs, however, do not contain sufficient lime for shell formation, and an extra supply of this material is required.

To obtain the best results in egg-production from confined laying or breeding stock, some form of animal food should be supplied every day. The term animal food denotes a number of highly nitrogenous substances fed to poultry. The most important are waste meat, ground raw bones, fresh fish, and skim milk. A large amount of animal food is necessary during the moulting time, for the growing feathers require the nitrogenous matter that meat supplies.

Waste Meat.—This may consist of meat scraps, livers, etc., and can be fed either raw or boiled. The water used to boil the meat in should be fed in the mash.

Ground Raw Bones.—The bones should be finely ground up, so that

the fowls can eat them. These, then, form a nutritive food that is relished.

Fresh Fish.—For breeding fowls it would be satisfactory, but for pullets producing eggs for table, fish is apt to flavour the eggs.

Skim Milk.—This has very high feeding values for fowls. In the rearing and fattening of chickens its value cannot be overestimated. In fact no satisfactory substitute has as yet been discovered in the crate-fattening of chickens. Skim milk should be used to mix with the mash for laying hens.

It is preferable to feed a number of grains rather than to limit the selection to one sort. Poultry will thrive better on a variety of food-stuffs than they will on a single food of the same nutritive value. An ideal feeding grain is wheat and oats mixed together. On cold days maize can be included, but left out on warm days. Oats is the most perfect grain, containing 14 per cent. water, 13·17 albuminoids, 7·03 fat, 66·97 carbohydrates. Heavy oats should be obtained, as well as of a good quality. Inferior oats contain about 20 per cent of husk and fibre, which has no feeding qualities. In the morning, during the cold months, after the warm mash, each fowl should receive a handful of the smaller grains, *i.e.*, buckwheat dari, etc. These small grains, well distributed in the litter, will compel exercise and so fill the egg basket.

Water.—Plenty of water is indispensable to the health of the stock. Laying hens require an abundant supply of fresh water on account of the great percentage of water in eggs.

Brown Eggs.—Refuse (shell, 10·9; water, 64·8; protein, 11·9; fat, 11·2; ash, ·7

White Eggs.—Refuse (shell, 10·7; water, 65·6; protein, 11·8; fat, 10·8; carbohydrates, nil; ash, ·6.

If we analyse brown eggs, we find that they contain on an average 64 per cent, and white eggs, 65 per cent. Seeing that the egg contains such a large amount of water, it is very necessary that hens should only have access to clean and fresh water. Laying hens should be wired off from stagnant water, ditches, etc., if the eggs are to be sold for table use. I once read that twelve eggs contain approximately one pint of water.

Lime.—Laying hens must have lime for the formation of egg shells. A single hen per annum produces approximately over 2 lbs. of lime. How can a hen obtain all the lime necessary for her eggs. Oyster shell (ground) is cheap enough (2lbs. for 1½d.), and must be given.

Grit.—Poultry masticate their food by a grinding process in the gizzard. The more hard and insoluble the grit is the longer it will perform its function. Flint grit is very cheap, 2 lbs., 1½d., and different sizes are manufactured, both for poultry and chickens.



FIG. I.



FIG. II.



FIG. III.

TYPES OF MECHANICALLY PROPELLED VEHICLES.

Fig. I. : A nineteen-seated 16-h.p. Albion combination passenger and goods carrying vehicle for Colonial use. The seats are removable. Fig. II. : The single-decked Maudslay 'bus owned by the Midland Railway, and running between Rothwell and Desborough. Fig. III. : A handsome lorry supplied by Commercial Cars, Ltd., through the Crown Agents, to the Government of Uganda.

(See Article on "Mechanically Propelled Vehicles as Feeders to the N.G.R.")

Blocks by Courtesy of "S.A. Railway Magazine."

Green Foods.—Vegetable foods such as clover is a very valuable one. clover hay should be cut into small lengths with a chaff-cutter and placed into sacks. A handful to three adults is enough. Place the required quantity in a bowl, and pour over it boiling water; after soaking eight hours or so, mix in the mash. In each 1,000 lbs. of clover there are nearly 30 lbs. of lime, hence it becomes an essential part of the ration given to fowls.

Cabbages and other green foods are necessary at midday. The yolks of eggs laid by hens that have little access to green stuffs are always very pale. Hence green stuffs are necessary to tone the yolks to that bright yellow which is so characteristic of the new laid egg.

Don't forget that there is more profit in coaxing a horse than in kicking him, and try gentleness and see how it goes.

In buying a cow avoid the one with a restless disposition. There is a difference between high nervous development and restlessness.

Have patience with the calf. Don't expect him to know how to drink when he is only a day old. You certainly knew less at this age.

Water being lighter than milk, the specific gravity of milk is lowered by addition of water. Therefore, it is easily possible by removing cream from normal milk to increase the specific gravity, and then, by adding water, to decrease the specific gravity again to that of normal milk. The addition of sugar, salt or any similar substance to milk increases the specific gravity. Since water has been the most common adulterant of milk, it was formerly thought that such adulteration could readily be detected by ascertaining the specific gravity, but the results of using the specific gravity may be very misleading, when considered without reference to any other factor.—*Lucius L. Von Slyke* (*"Modern Methods of Testing Milk and Milk Products."*)

Natal Bee-Keepers' Association.

MONTHLY NOTES AND COMMENTS.

By W. C. MITCHELL, *Government Apiarist, Central Experiment Farm, Cedara.*

WHO shall deny that in a country which annually imports over 14,000 lbs. of honey, which possesses no winter worthy of the name and where foul brood is unknown, there are vast possibilities in the yet unexploited fields of apiculture? Such a country is Natal!

It is now proposed to initiate a series of periodical notes on bee-keeping, hoping that they may be of some assistance to the many who have a few hives, and also the means of interesting a still larger number in the subject. By this means it is hoped the South African public may shortly be relieved of the necessity of satisfying their craving for sweet things with imported honey.

Bee-keepers in South Africa are waking up to the fact that if they wish to compete in the open market with their produce, they will have to go to work on up-to-date lines. The old packing-case which has done duty for so many years must be discarded in favour of a movable frame hive, with a view to the production of honey in a neat, clean and marketable condition. With these movable frames the state of the hive and its inmates can be ascertained at any time; swarms can be partially controlled; fresh colonies be made from selected stocks, and last but not least, when removing the honey there is not that wholesale killing of bees which can hardly be avoided otherwise. There are many other advantages attaching to up-to-date methods which we cannot discuss at present. These will quickly become apparent to all converts to modern practice. There is another means, however, of improving the commercial possibilities of bee culture, which must come into play with the use of modern appliances; this is co-operation among bee-keepers. With this end in view a Natal Bee-Keepers' Association has been formed, with the object of furthering the interests of apiarists in the Colony. Rule 2 of the Association reads:—"The aims and objects of the Association shall be the encouragement, improvement and advancement of bee-culture in and throughout Natal; to educate and bring together bee-keepers and work for the humane and scientific treatment of the honey bee; to supply South African markets with honey produced in Natal."

The subscription to the Association is only 2s. 6d. per annum, it being hoped that by keeping the figure so low every Natalian who owns a hive of bees will become a member. The first direct advantage that

members will reap is a special *members' discount* of 12½ per cent. on all bee goods purchased from certain firms in Natal, whilst a firm in the Transvaal offers as much as 30 per cent. on some lines. Other reasons why all who own "a bee" should join are that the present demand for their produce can by co-operation be improved and enlarged; beginners in apiculture can obtain free advice and assistance; by comparing notes in these columns improved methods will obtain which mean bigger yields and larger profits.

The writer hopes that all bee-keepers will communicate with him as early as possible, enclosing a remittance for their annual subscription.

ANNUAL MEETING OF THE ASSOCIATION.

The second annual general meeting of the Natal Bee-Keepers' Association was held in Maritzburg, in a room kindly placed at their disposal by the Education Department, on Friday, June 18th, at 10 a.m. The item on the agenda was the election of officers. Miss Ritchie was unanimously elected President, and Mr. W. C. Mitchell (Cedara), Hon. Secretary and Treasurer. Owing to the attendance being rather disappointing it was agreed to elect a committee of five (three to be a quorum), to remain in office for six months, when it was hoped that the members' roll would be considerably augmented. The following committee was then elected:—Mrs. Mitchell (Cedara); Messrs. J. A. C. Auld (Donnybrook); H. E. Carter (Howick); W. Fuller (Maritzburg); J. W. Gavin (Camperdown); W. L. Stead (New Leeds); the President and Secretary being members *ex officio*. A sub-committee, consisting of Miss Ritchie, Mr. Fuller and the Secretary was appointed to deal with the matter of affiliation with the South African Bee-Keepers' Association.

In order to induce as many members as possible to join the Association the subscription was allowed to remain at 2s. 6d., exclusive of the official organ. The *S.A. Poultry Journal* and the *Natal Agricultural Journal* were chosen as the official organs of the Association; the combined circulation of the two being already a large one, this arrangement should obviate any additional expense on the part of many members.

After considerable discussion it was decided not to appoint any depot for the sale of members' honey, but that a minimum scale of prices be drawn up, and that members shall not be permitted to offer their honey below the Association's price. It was pointed out during the discussion that some members might put up their honey in a much cleaner and neater condition than others, and that this honey would find a ready sale at prices above the minimum scale, thereby helping to educate careless members, but that in addition, the Association should

use every endeavour to improve the general production and "get-up" of its members' supplies.

On the question of the use of a uniform package and label, it was decided to adopt the label of the S.A.B.K.A. if we became affiliated, but that members would have the option of using their own private label in addition if they so desire.

The Secretary intimated that he would be extremely glad if all members would drop him a line occasionally, in order that a bee-keepers' calendar could be tabulated, giving the source of honey in different districts and times of honey flow, with any other matters of general interest.

A vote of thanks was tendered unanimously to Mr. Bennett for very kindly placing the room at the disposal of the Association, the Secretary being instructed to write him to that effect. With a vote of thanks to the Chairman the meeting terminated.

Apiculture.

NOTES FOR BEGINNERS.

By W. C. MITCHELL, Government Apiarist.

THE following lines are penned in the hope that the information afforded may be of some assistance to beginners and to those who are adopting modern practice.

In districts provided with an early spring flow swarming may be looked for in September. I have had a swarm out in August, but this is exceptionally early and would only occur in the case of a colony that had come through the winter in a strong condition. To take full advantage of these swarms and to obtain the honey they produce in a clean, neat and marketable form, readers must understand that it is essential to hive the bees in what is called a movable frame hive; the advantages these possess over the ordinary box are manifold. The only way one can obtain honey from the latter is by cutting out the combs and straining them in a piece of muslin. The honey thus produced is not a saleable article; it is more or less mixed with pollen, or bee-bread, as it is commonly termed, and a large portion of it comes from cells in which larvae have previously been reared, which means that the honey will be dark and of an undesirable flavour, but even worse than this it will often

occur that a certain number of larvae that were in the cells at the time the comb was removed from the box will be crushed and mixed with the material to be strained! It will be patent to all that such methods as these must greatly detract from the marketable (?) value of the article produced; one is loth to call it honey. Now, a movable frame hive obviates working under any of these disadvantages; with it honey of "fancy" quality can be produced in two distinct forms, either comb or extracted, the article will be clean and wholesome and will not be obtained at the cost of the lives of many of the industrious workers who have collected the stores, as would be the case when working under the old-fashioned methods.

Comb honey is produced in small wooden frames or boxes, called sections, capable of holding about 14 ozs. of honey. Each can be removed independently of the others (though in actual practice this is rarely done), without killing bees, and will contain neither pollen no brood. The production of honey in this form is more suitable than the extracted for the man with only one or two hives, as the latter entails a greater expense in obtaining an extracting machine, etc. The various operations to be performed in the production of each will be dealt with on some future occasion; for the moment I wish to deal with hiving the spring swarms and have been digressing. Have your frame hive ready for your swarm before the swarm is ready for the hive; with the latter in readiness you can afford to wait for the bees—the bees will not wait for you!

There are two types of hives in use in Natal; the English double walled hive with non-reversable, open-end frames, and Root's Danzenbaker hive, with single walls and reversable closed end frames. The former is fast going out of use in favour of the equally good and far cheaper Danzenbaker. A crate containing five of these, in the flat, costs 65s. in Maritzburg, members of the Natal Bee-Keepers' Association obtaining them considerably cheaper. Hives in the flat are put up in crates; all parts fit accurately, a hammer being the only tool required to put them together; full directions for fitting them up being contained in each crate. To these directions there are two exceptions which should be observed; do not nail the small entrance bar to the floor board, and instead of inserting narrow strips of foundation comb in the brood frames whole sheets should be used. These will not be supplied with the hives, and must therefore be purchased separately. Obtain "medium brood" foundation, allowing rather more than a pound for each hive; this will cost 5s. 9d. per pound or less to members of the N.B.K.A., but the outlay will be an economical one. Each pound of wax secreted by the bees is obtained at the expense of 12 pounds or more of honey; the value of this at 6d. per pound would therefore more than exceed the cost of the comb foundation, but additional advantage is gained by means of the

great saving of time. A strong swarm, hived with full sheets of foundation will often have several of the frames drawn out and full of eggs in 48 hours, which means that a strong force of bees will be available from this hive very much sooner than could be expected where they had to build all their comb for the production of brood. The full sheets should be wired into the frames. The *modus operandi* is as follows:— Bore five small holes along the centre of the top and bottom bars of the frames, the two end holes being 1 inch from the ends, the others being equidistant from these and from each other; do this before the frames are nailed together. When the holes are bored, nail the frames and insert the rivets in the end bars. For wiring, No. 30 wire is used; cut off a piece $2\frac{3}{4}$ times as long as the frames, run this through the holes backwards and forwards across the frame so as to have five perpendicular wires, leave slightly slack and secure the ends by means of small tacks. To avoid bending the bottom bar when wiring and thus obtaining a frame which is convex on the lower side, insert a piece of wood in the centre of the frame, between top and bottom bars and of the exact length of the end bars, removing same when the operation is completed. Having fixed the foundation in the frames (instructions for which will accompany the hives), wires must be embedded in the wax. This is best accomplised with the aid of a small implement called a spur wire embedder, which is simply a small grooved wheel mounted on a handle and is used hot. By running the wheel along the wires the wax is melted and the foundation securely fastened. To support the foundation while wiring a small board must be used, just small enough to fit inside the frame and of exactly half the thickness of the end bars. A very little practice will show just how hot to have the wheel and how much pressure to apply so as not to drive the wire right through the wax and yet fasten it sufficiently, the object being to get the wire as near tthe centre, or mid-rib, as possible. The choice of a hive-stand depends largely upon the locality of the apiary; in some places it will be highly important to have this ant-proof, which can be attained by standing the legs in small dishes containing water; a bandage of cotton wool round the legs has also been recommended for the same purpose. Never place the hive on the ground. It is highly important to make sure that the two sides of the hive are dead level, otherwise the combs will not hang perpendicularly in the frames; if it be tilted slightly from back to front no harm will be done, as it will help to keep out driving rains, but under no circumstances should the opposite be the case. See that the hive is always preserved from the weather by an efficient coat of paint, white for preference. A certain amount of shade is required, especially in the middle of the day, but too much shade is conducive to dampness in the hive, whilst the morning sun shining in at the entrance appears to stimulate the bees to early trips afield.

Very often a tendency on the part of any colony to swarm may be detected by the bees loafing and clustering at the entrance for a day or two previously, but this is not always seen, nor is it an infallible sign of swarming; in very hot weather it may be noticed in strong colonies, when greater ventilation should be at once provided, or more abundant shade.

It is seldom that a swarm issues and leaves at once for some pre-chosen site; as a rule, after issuing and flying around for a few minutes the bees cluster. Where only small bushes exist in proximity to the apiary little trouble will be experienced in hiving the swarm, but, if the bees cluster on a high tree one will probably resolve then and there to work on the "clipped queen" method ever after—of this more anon. For controlling a swarm in the air a spray pump will be found most useful, causing the bees to cluster quickly, whilst if they be seen to be making for some undesirable spot they can be headed off by directing the spray in that direction.

Manum's swarm catcher is a handy tool to assist in hiving swarms clustered some height from the ground. This consists of a basket or cage made of wire cloth, in the shape of an inverted pyramid, hinged on the end of a long handle enabling it to swing freely in a vertical position. The cage when in use is passed over a clustered swarm from underneath, a horizontal movement then brushes the swarm off its resting place, catching the falling bees inside the wire cloth cage, the lid of which is then quickly shut down. The cage is now left in the vicinity for a few minutes, when the remainder of the swarm will quickly cluster on the outside. A little ingenuity will make a very good substitute for the "Manum's" with the aid of a bag and a wire hoop; the swarm catcher is fitted with a tripod to permit of poising the long handle in the air while the bees are clustering round the cage; this addition can be made in the case of the home-made article also. The hive having been prepared, the swarm should be hived as soon as possible; place a flat board, sloping from the ground to the hive entrance in front of the hive, and shake the bees on to this with a sharp jerk; a joyful hum will be set up, and amidst much fanning of wings the army of workers will immediately take possession of their new quarters. A careful watch should be kept for the queen to make sure that she has entered, for unless she be present the swarm will abscond. Should the bees have clustered on a bush and be easily accessible without the aid of a long handled contrivance, place a box or skep immediately underneath the swarm and give the branch to which they cling a sharp jerk, dropping them into the receptical placed in readiness for them; turn this on its side and wait a few moments while the bees in the air join those in the box, then hive as stated above. When clustered on the trunk of a tree or some similar situation they may be brushed into a box with the aid of a fowl's wing or a proper bee brush. It is seldom that trouble is experienced through the bees of a

swarm being vicious, as they are usually gorged with honey, in which condition they seldom sting. Where one can have access to a frame of brood from another hive an excellent plan is to insert a frame containing brood in all stages; no trouble will be experienced through the bees absconding where this is practised. Failing a frame of brood, fix a piece of queen excluder zinc over hive entrance; this effectually cages the queen, without whom the bees will not leave. Should there happen to be a dearth of nectar a little judicious feeding may be resorted to with advantage. A few hours after the bees have been hived, quietly lift the cover to observe how many frames they are covering, now contract the hive to just that number of frames by inserting the division board next to the bees. The last-named device is a plain board, supplied with each hive, of the same size as the brood frames, and it is used to conserve the warmth of the cluster by giving them a smaller area to keep warm. Later on as the colony increases in number the division board may be moved, giving the bees more room, but in this operation be guided by the rule that the bees should be allowed no more frames than they can properly cover.

Swarming is the natural method of increase; in modern apiculture it is possible, and may be desirable, either to discourage this increase or to adopt artificial methods as a means of augmenting same. These practices will be described later.

Charcoal is a great aid to good digestion among a flock of poultry. Keep a little constantly with them.

The Agricultural News (Barbados), in a recent issue, contains a valuable article on Lima beans. In Mauritius, Lima beans are cultivated on a large scale, and turned into the soil as a green manure. The plant is one which contains a cyongogenetic glucoside, *i.e.*, a chemical compound which, under certain conditions, is capable of yielding prussic acid. These plants are, therefore, dangerous as a stock food, and many cases have been reported from Mauritius and other countries of animals having been poisoned as the result of eating the green vegetation. Fatal results to stock, too, have not infrequently followed the consumption of raw seed (beans) in Mauritius and Java. The beans on analysis have been shown to contain varying quantities of prussic acid.



EXPORT OF CITRUS FRUITS.—I.

The Naartie Graders at the Government Fruit Packing House, Durban.

(See "Traffics and Discoveries.")

Industrial Alcohol and Fibre from Leaves and Stems of Plants.

By Thomas Barraclough.

[The following article, which was originally contributed to the *British Trade Journal*, has been sent to us by a correspondent as likely to prove of interest to many readers of the *Agricultural Journal*.—Ed.]

During the last fifty years an amazing amount of skill and enterprise has been devoted to the utilisation of what our forefathers called "refuse," or "waste," resulting from mining, industrial, and other processes. They do not seem to have cared much for any results except obtaining or manufacturing the special articles they had in view. The so-called "waste" was considered valueless, and in many cases proved to be a serious nuisance.

Times have changed; the term "waste" as formerly understood is now largely considered to be the offspring of ignorance. Intelligence, technical and commercial, has come to the rescue, and the by-products (formerly called "waste") accruing from an enormous number and variety of mining and manufacturing processes are now made the source of great and ever-increasing profit. In some cases the by-products are of more value than the articles originally produced. In other cases the value of the by-products not only pays the cost of the original process, but leaves considerable profit. In many other cases the knowledge that valuable by-products can be obtained from raw material, not considered worth treating under former conditions, has resulted in the establishment of an immense number of new and profitable undertakings. It would be an easy matter to instance some of the most striking of these cases, but space forbids.

New Treatment of Leaves and Stems.

The subject of the present article is to point out that, by means of greatly improved and novel methods of treating the leaves and stems of certain classes of plants, not only can their fibres be extracted, but their juices can be utilised for the production of industrial alcohol. In other words, two valuable articles of commerce can be produced from the same raw materials. I refer to many varieties of the Agave (aloe) family, and also of the closely-allied families of Fourcroya and Maguey, likewise of the Sanseviera family. There are other plants the leaves and stems of which contain equally valuable fibres and juices. Our knowledge of them is daily increasing.

Many of the above plants are at present utilised solely for the production of their fibre. Some of them are utilised on a very large scale in Mexico, mainly for the production of a kind of beer, called Pulque; others are utilised for the production of a kind of brandy, called Mescal, or Mexical. The so-called "Pulque Maguey," which bears leaves up to 100 lbs. weight each, is the plant mostly used for the purpose of producing pulque, but many other varieties of the Agave family are also utilised, such as the Agaves: *Americana, Scolymus, Prostrata, Potatorum*, etc. Some descriptions of Agave are specially utilised for the production of "mescal"—I mention *Aurea* and *Fequilana*. The pulque is not only produced in enormous quantities for drinking, but is also used for distilling purposes.

Analysis of the juice of the Pulque Maguey is reported as showing as follows:—9·553 sugar, 0·540 gums, 0·726 salts, 89·181 water, etc.

Instead of entering into a full account of the methods current in Mexico of obtaining the juices from the plants above mentioned, I limit myself to pointing out that these juices, whether obtained from the stems or the leaves, contain a large amount of sugar in varying quantities, thus rendering them very suitable for the distillation of alcohol.

THE PRINCIPAL VARIETIES.

Botanists affirm that there are 185 varieties of the Agave family, and of these about fifty varieties are well known. There are about fifteen varieties of the Fourcroya, and twelve varieties of the Sanseviera growing in most tropical, semi-tropical, and other countries. It is not possible in an article of this description to give particulars of the relative values for manufacturing purposes of the many varieties of these plants. The value of their juices for distilling purposes depends not only on the nature of the plants, but also on the nature of the soil, the climate, the range of temperature, the elevation of the place of growth, etc. The value of their fibres is well known or easily ascertained.

A few remarks respecting the growth of these plants may be interesting. (1) In some countries the plants I have mentioned and some others are now largely and successful cultivated, solely for the valuable fibres they contain. Their cultivation and the extraction of their fibres is becoming an ever-increasing and profitable business. (2) In some countries certain of these plants are cultivated mainly because of their valuable protective nature. Thus, in India the Agave *Americana* and *Vivipara* are used to form impenetrable fences for the protection of railways and of enclosures generally, and for preventing the travelling or transference of sand and surface soil by the hot winds. The leaves of these plants can be cut from time to time and utilised for the production of fibre and industrial alcohol. (3) In other countries, one of which I instance, *viz.*, the Mauritius, the *Fourcroya Gigantea* grows wild on

barren shores and on land where nothing else will grow. It is not cultivated but simply harvested. The crops of leaves are cut and gathered whenever it suits the convenience of the owners or buyers of the leaves, who have factories for the extraction of the fibre; the juice is not utilised at present. (4) In India, Africa, Mexico, Australia, and other parts of the world some of these plants, for instance, the Agaves and Fourcroyas, grow wild in arid desert wastes, where scarcely any other plants can grow. They cover immense areas of rocky ground and grow at various elevations, say, from the plain up to 7,000 feet above the sea.

Recent Developments.

The plants growing on these wastes have generally been considered practically valueless for various reasons: Ignorance of the very valuable nature of the leaves and how best to treat them; the cost of harvesting, transporting, and treating the leaves; questions of labour, transport, water supply, etc.—all these, but principally ignorance, have discouraged enterprises which, to be thoroughly successful, should be on an important scale.

At the present time, in consequence of the ascertained fact that these leaves possess a double value (for fibre and alcohol), much attention is being drawn to the exploitation of these large areas of plant-covered land. Concessions and monopolies are being obtained with the view of realising the immense profits resulting from the obtaining of two very valuable products from the same raw materials. These profits justify the use of improved methods of transporting the leaves with great economy to central works by the use of special trucks or wagons running on roads or light rails, and hauled by tractors driven by alcohol.

In most countries alcohol is usually placed in bond under varying conditions, and when intended to be used for motive power, fuel, light, or manufacturing purposes it undergoes a denaturing process, which renders it unfit for drinking. This process consists essentially in adding to the alcohol a substance soluble therein of a really bad taste or odour or both, and of an intensity which renders it impossible to use the mixture as a drink

The denaturing material mainly used is Methyl alcohol; there are many other materials (about thirty) which are equally effective. It is customary to add to 100 parts, by volume, of alcohol (not less than 90 per cent. strength) ten parts of approved methyl (wood alcohol) and one-half of one part of approved benzine. This blend or mixture is classed by leading governments as completely denatured alcohol.

Industrial alcohol is now being increasingly used with great efficiency and economy in many parts. The leaves and stems grow in country districts, the industrial alcohol is produced there, and is consequently very cheap. All kinds of engines, stationary, portable, for motors, for

road and water transport, etc., can be driven by it. It is used for many industrial purposes; also for agriculture, such as for ploughing, harvesting, mowing, pumping water, sawing timber, grinding grain, etc. Industrial alcohol, 40 deg. Cartier, can be used for all driving purposes.

Industrial alcohol is also being increasingly used for heating purposes; it burns with a blue flame, intensely hot and without smoke. Its odour is not disagreeable, rather the contrary; and consequently it is well adapted for heating houses and premises of all kinds, for cooking, coffee roasting, etc. Many important improvements have, as a consequence, been recently made in the construction of heating apparatus, cooking and other stoves, by adapting them for burning alcohol in a thoroughly practical and economical manner.

For illumination alcohol is also proving itself very valuable and safe; the large and increasing demand for its special lamps has brought into the market many very practical improvements.

ALCOHOL FOR MOTIVE POWER.

The following notes concerning the application of industrial alcohol for motive purposes may be interesting, this being the most important of its present uses. Alcohol produced at 7d. to 9d. a gallon is a most valuable source of power, especially in distant country districts, where other fuels are obtainable only at much higher prices. Alcohol is *far less dangerous* than gasolene, and there is a marked advantage in its use, seeing that higher compression pressure may be used without pre-ignition, this tends to increase the efficiency of the engine; the expansion of alcohol, however, not being so great as that of mineral spirit, power is slightly affected. Alcohol engines are nearly all of vertical construction, and can be run equally well with gasolene. Alcohol works as well as gasolene in a gasolene engine with slight modification of the carburettor, as alcohol does not carburet so easily "at starting" as gasolene. This latter becomes volatile at a temperature of blood heat (98·5 degs. F.), but a much greater degree of heat (158 degs. to 176 degs.) is necessary to volatise alcohol rapidly enough for motor purposes.

Carburettors made to burn alcohol are furnished with a simple heating apparatus, using the exhaust of the engine to supply sufficient heat to the vaporising chamber to suit alcohol. Alcohol of 40 degs. Cartier is well adapted for alcohol engines. One pint per hour per horse-power is stated to be the average consumption of alcohol. The same remark applies to gasolene, not exceeding 88 degs. nor less than 62 degs. of gravity. Engines for alcohol fuel are usually constructed with a single cylinder up to 20 h.p.; with two cylinders up to 40 h.p.; above 40 h.p. triple cylinders are used.

In cases where a variety of fuels may be expected, the carburettors are so made that they work equally well with alcohol, petrol, or kerosene

by arranging for different degrees of heat in the vapourising chamber to suit the different fuels. Important improvements have recently been made in this direction in order to produce engines capable of working well and economically with a variety of fuels.

Alcohol Production Process.

A few remarks respecting the processes of producing alcohol from the juices of the leaves and stems and the extraction of their fibres may be interesting. To produce alcohol the leaves and stems are first passed through a special crushing and juice-extracting machine, which performs three operations. It slits the leaves into longitudinal strips, the smaller ones being slit up the centre, while the larger ones are slit into four strips. In passing through its three pairs of large brass rollers the leaves and stems are not only crushed with great pressure, but the upper and lower skins are simultaneously scraped by a special arrangement, so as to facilitate the flow of juice and the subsequent extraction of the fibres. The juice, after being prepared, is then distilled. Special continuous-working steam stills are used for distilling the alcohol in one operation in a simple and economical manner with a minimum of fuel and water. These stills are simple in construction, easy to erect, and capable of being worked by an ordinary intelligent mechanic. They exhaust entirely all the spirit from the wash, and produce alcohol of the highest commercial strength. They are constructed of many sizes—small, medium, and large—up to the production of several hundred gallons of pure alcohol per hour. With each still are supplied full details and instructions for working the process. The cost of producing the alcohol is very small. It is, of course, governed by various matters, such as the quality of the juices, the cost of fuel, labour, etc., and the size of the installation; the larger it is, the smaller the cost of producing alcohol.

New Fibre Production Processes.

The crushed leaves, strips of leaves and stems from which the juices have been extracted are soaked, thoroughly washed by special machines, and freed as far as possible at this stage from non-fibrous matters, such as pith, bits of skin, etc. They are then placed in vertical kiers or boilers, specially constructed for treating their contents in the most efficacious and gentle manner, in order to soften and remove the gums, loosen the remaining non-fibrous matters, and to free and clean the fibres. This is effected partly by boiling them in hot water with very weak chemical liquors under high steam pressure. Whilst still in the kiers, the fibres, after boiling, are thoroughly washed with hot and cold water. The liquors, likewise the hot and cold water, are caused to circulate *continuously* through the fibres in the kiers. It is by reason of the high pressure used in boiling and of the constant circulation, that the

chemical liquors used are of the weakest, so as not to damage the fibres, either as regards their strength, colour, or ductility.

After removal from the kiers, the fibres are again specially washed; then dried in the open air or in a special fibre-drying apparatus, so constructed that it dries large quantities of fibre quickly, not so much by great heat as by copious currents of dry air so as not to affect the quality of the fibres.

In some cases they undergo a brushing operation before packing into bales. This brightens the fibres and materially increases their selling value.

The effect of treating the crushed leaves, strips of leaves, and stems, from which the juice has been previously extracted by this process, is threefold:—

(1) It extracts from them very economically the full amount of fibres which they contain.

(2) The fibres extracted are strong, bright, clean, ductile, and of good colour and quality.

(3) Special attention is called to the fact that there is no appreciable loss or waste of fibre by this process.

A complaint frequently heard in connection with the working of most of the modern, powerful, quick-running, fibre-scutching machines is the serious loss of good fibre resulting from the system and the immense speed of their scutching process. This loss varies from ten to twenty per cent.—in some cases even more.

The saving of fibre by the new process more than pays for the cost of extraction in most cases. In other cases, after allowing for the increased quantity of fibre produced, the cost of extraction is brought down to quite a nominal figure. Stress is again laid on the fact that the raw materials used in this process are a by-product of the alcohol process.

Complete installations of the machinery and plant for treating the crushed leaves, the strips of leaves and the stems, and for producing the fibre ready for market can be obtained, together with full particulars of the process.

SIZE OF INSTALLATIONS.

I do not advise the installation of combined alcohol and fibre-producing works on a very small scale, because economy of production must be considered. Medium and large-sized installations work much more economically than those of small size, as regards fuel, power, chemicals, labour supervision, etc.; the larger the works the cheaper the cost of producing alcohol and fibres. The quantity of leaves and stems at disposal or obtainable in a given time and the amount of capital involved are leading factors in deciding on the size of the installation. It is a simple matter so to arrange the installation for both processes that it can be easily increased in the future.

In districts where the leaves and stems are available, growers and landowners can advantageously combine to form a company or to sell and deliver their leaves and stems to central works for treatment.

In considering the size of the proposed installation, persons interested in the matter should bear in mind that the machinery and plant used for the two combined operations can also be separately utilised. Thus, in the case of certain leaves and stems containing plenty of juice suitable for distilling and no fibre worth extracting, the first part of the installation can be used, as also for ordinary distillation from grain, etc. There are also certain leaves and stems that contain very valuable fibres, but little or no juice suitable for distilling. In this case, the second part of the installation can be utilised. The matter is simple, and there is no occasion for any risk being run. Information can be obtained respecting the value of the juices for distilling purposes and the value of the fibres. The best method is to prepare samples of the juice, expressed from the leaves or stems, and then to obtain an expert analysis of them in order to prove their suitability or otherwise for the economical production of industrial alcohol.

Care should be taken that the juices do not come in contact with iron. They are often very acrid and liable to be affected by contact with iron. If the samples have to be sent some distance for analysis it would be better to put them in glass bottles.

As regards the fibres, it is an easy matter to obtain samples by hand labour and to submit them to experts for valuation; the quality of the fibres and their prices can thus be ascertained. The percentage of fibres in the leaves and stems is also a very important matter. It varies exceedingly, and can only be ascertained by carefully weighing the quantity of raw material treated and by afterwards weighing the dry fibre extracted so as to ascertain the percentage

Several important installations are now under consideration, and it is hoped that these remarks will be of widespread interest and usefulness.

A horse that is a fast walker is more valuable to the farmer than a fast trotter.

Don't dock your horse's tail. He needs it in winter as well as summer, and it was put there by a master hand.

Division of Agriculture and Forestry.

MONTHLY REPORT FOR JUNE.

SCHOOL OF AGRICULTURE AND FORESTRY.

THE results of the Sessional Examination held at the beginning of last month have proved exceptionally encouraging to all members of the teaching staff, the standard maintained in the papers submitted being remarkably high. The following eighteen papers reflect the ground covered by lecture courses during the preceding session:—

ELEMENTARY SUBJECTS.

FIRST YEAR: SESSION 2.—SESSIONAL EXAMINATION, JUNE, 1909.

STAPLE CROPS.

1.—How would you proceed to establish a pedigree strain of maize?

2.—What distances of planting would you adopt for maize in the midlands and on the coast of Natal respectively? Give reasons for your decision.

3.—By what considerations would you be guided when deciding upon:—(*a*) the size of sets; (*b*) distance of planting; and (*c*) manuring of the potato crop?

4. Estimate the importance of spraying as a method of prevention of disease in the case of the potato crop. How would you prepare Bordeaux mixture in normal strength?

5.—At what stage of growth would you harvest a maize crop for the preparation of silage? Give reasons for your decision.

6.—Describe suitable rotations of crops for a system of mixed farming in the midlands of Natal.

7.—What measures would you take to improve the fertility of poor or exhausted lands?

8.—Give some account of the place of Soy bean and Cow pea in Natal agriculture. Describe approved methods of cultivation for these crops.

THE STUDY OF BREEDS.

1.—Account for the presence of red, white and roan beasts in more or less definite proportions in a given herd of Shorthorns.

2.—What do you understand by "line-breeding"? Describe the principles involved.

3.—The sheep-breeders of Great Britain have sought improvement in carcase. By what methods has this object been attained, and to what extent would you recommend their adoption in Natal in the event of an export trade in mutton and lamb being successfully established?



EXPORT OF CITRUS FRUITS.—II.

View showing the Packers at Work.

(See "Traffics and Discoveries.")

4.—How would you to proceed to examine and value a growing fleece of wool?

5.—Assign causes to the following faults in wool:—(*a*) Excessive grease; (*b*) unsoundness; (*c*) harshness; (*d*) kemp; (*e*) hair.

6.—Compare and contrast the Rambouillet and American Merinos.

7.—Describe the conformation to be sought when breeding:—(*a*) Heavy horses for draught purposes; (*b*) Artillery horses to meet military requirements; (*c*) Sugar-mules for employment on the Natal coast.

8.—The establishment of a bacon-factory in Natal opens a profitable market for bacon pigs. Discuss the question of the selection of suitable breeding-stock.

Dairy Practice.

1.—What course would you adopt when the after-birth is retained after calving? 15

2.—Give the period of gestation of as many domestic animals as you can. 15

3.—How would you treat cow

(*a*) During pregnancy? 5

(*b*) At the time of parturition? 5

(*c*) When the fœtus is in three different unnatural positions? 6

4.—What is the Babcock Test, and how is it used? 8

5.—How must cream be handled and kept in order to make the most and best butter? 10

6.—Give a detailed account of how butter is made, giving a list of temperatures used in preparation of utensils. 20

Veterinary Science.

1.—Name two medicinal agents (medicines) acting as cathartics (purgatives), and their doses, for the horse and ox. 5

2.—What are the symptoms of Strangles? Give a detailed description of the treatment of an acute case. 14

3.—What do you understand by Nagana? What domesticated animals are commonly affected? Detail the symptoms and treatment. 10

4.—What are the differences between Spasmodic Colic and Flatulent Colic? Detail the symptoms and treatment of each in the horse. 18

5.—If a medium-sized horse is in perfect state of health, not being exercised, what will be his temperature, the number of beats of pulse per minute, and the number of breaths taken per minute 10

6.—State what you know of Biliary Fever in the horse, its cause and treatment. 14

7.—Give the names of three medicinal agents used for reducing fever in animals, and their doses for horses, oxen and dogs. 10

8.—What are the symptoms of Glanders in the horse? What animals are susceptible to its attacks, and what portions of the horse's body are attacked? What is the difference between the micro-organism

of this disease and that of Supurative Lymphangitis, and what methods are employed to enable you to ascertain if the patient is affected by Glanders or by Supurative Lymphangitis? If either disease is proved to exist what course would you pursue in connection with it? 18

ELEMENTARY AGRICULTURAL CHEMISTRY

1.—What is meant by the "boiling point" and "freezing point" of a liquid? Why, in the determination of the former, must the atmospheric pressure be taken into account?

2.—Into what number of degrees are the Fahrenheit and Centigrade scales of temperature divided? What is taken as the zero for each scale? What fraction of a degree Centigrade is a degree Fahrenheit? Turn 15 deg. C. into deg. F Turn 19 deg. F. into deg. C.

3.—Define "Specific Gravity." What is meant by "Density" and haw may it be expressed? What is meant by saying the specific gravity of milk (at 15 deg. C.) is 1.036? Given that 4.6 cubic feet of soil weigh 761 lbs. 14 ozs. what is the specific gravity of soil?

4.—Describe fully two experiments by which the composition of water has been established. What are the properties of water?

5.—What is meant by saying a water is "hard"? Distinguish between "temporary" and "permanent" hardness. Describe two methods by which the temporary hardness of a water may be removed.

6.—Give definitions of the following:—(1) Atom; (2) Molecule; (3) Element; (4) Compound; (5) Basic Oxides; (6) Acidic Oxides. Give examples of 3, 4, 5, and 6.

7.—Calculate the simplest possible formula for Nitrate of Soda, given the following data:—

One short ton of pure nitrate contains—

541.19 lbs. of sodium.
329.42 lbs. of nitrogen.
1,129.39 lbs of oxygen.

Short Ton—equals—2,000 lbs.

	Symbol.	Atomic Weight.
Sodium	Na	23
Nitrogen	N	14
Oxygen	O	16

8.—If you leave your plough and other implements made of iron or steel out in the open for any length of time, what happens? Explain the phenomenon. What is the chief agent causing the change that takes place? What do you know about the composition of the substance formed? To what class of chemical bodies does it belong?

Agricultural Botany.

1.—Describe the chief points of difference between a monocotyledonous and a dicotyledonous plant. Name four crops composed of plants of each group respectively, some of which have been, and some of which are still, growing on the College Farm. 35

2.—Compare a seed of a monocot. with that of a dicot., *e.g.*, the bean with the mealie. 25

3.—Beginning with the seed describe fully the botanical development of the mealie plant until seed is produced. Do the same in the case of the potato from "set" to seed. Why are potatoes not grown from seed? When is this method adopted? 35

4.—Make a sketch of a dicotyledonous stem. What is the importance of the vascular bundles? How do they differ from the vascular bundles in the monocot. stem? 30

5.—What is an annual, a biennial, a perennial and an ephemeral? Give examples. 25

6.—Name the specimens provided, and mention any botanical and agricultural facts known to you in connection with them. 30

7.—Make a sketch of a flower, and name the parts. What is the difference between the flowers of the pumpkin or cucumber and those of the Cape gooseberry or the potato? 25

8.—Explain clearly why when repeatedly mown a grass plot gets thicker at the bottom. What happens if the grass is allowed to seed?

Agricultural Botany (Physiology).

1.—Describe a growing plant cell and state the work performed by the different parts of the cell. Where are the growing regions in plants? 20

2.—What are the chemical elements essential to a growing plant? How could you prove by experiment that these are required by a plant?

3.—What are the proximate constituents of plants? Name several plants which are especially rich in any one of these constituents.

4.—How is the green colour of the plants connected with, say, the corn in the mealie ear, and the potato tuber? Is it an advantage to have crops with a good leaf surface? If so, why? Discuss the influence of too heavy dressings of nitrogenous manures in this connection, and mention any plants which are devoid of green foliage. 40

5.—What are the functions of (*a*) the roots, (*b*) the stem, and (*c*) the leaves of a plant. 20

6.—Describe the root system of (*a*) maize, (*b*) lucerne, (*c*) the potato. What is the practical importance of the differences in root structure? 25

7.—What points would you attend to in order to secure the maximum and uniform germination of your seeds in (*a*) a heavy stiff soil,

(*b*) a damp vlei? What influence would a rainy season be likely to have on next year's seed? 35

8.—You wish to buy lucerne seed, paspalum seed, and "seed" potatoes. What considerations would influence you in making your choice? The following information is given by your seedsman:—

	Paspalum Seed.			Lucerne.		
	A	B	C	X	Y	Z
Germination ...	90 %	85 %	70 %	95 %	80 %	90 %
Purity ...	70 ,,	90 ,,	80 ,,	85 ,,	95 ,,	80 ,,
Price ...	1s. 4d.	1s 6d.	1s. 2d.	1s. 4d.	1s. 2d.	1s. 3d

Assuming that 1s. 4d. is a fair price for sample A, and 1s. 4d. for sample X, which of the samples of paspalum and lucerne are really the cheapest? Would you ask for further information in connection with the seed?

FORESTRY.

1.—How would you proceed, if instructed, to lay out a tree plantation? 14

2.—What do you know about seed sowing? 9

3.—In choosing a site for a Nursery what factors would you consider? State your reasons. 9

4.—Describe the method of making a loam stack, and say what materials are used in conjunction with it in preparing composts employed in Nursery operations. 9

5.—Name the various kind of Wattles you know, and briefly state their economis values. 9

6.—What is a cutting? Describe the types of cuttings commonly employed in propagation. 9

7.—What methods of propagation of plants, other than by seeds and cuttings, are there? 9

8.—Write a short essay upon any subject connected with Forestry not covered by preceding questions (excluding Eucalypts).

HORTICULTURE.

1.—Why is the operation of Grafting or Budding necessary in the propagation of fruit trees?

2.—Describe the method of tongue or whip grafting.

3.—Give the general treatment recommended for young trees on planting out permanently.

4.—In what way is the balance between the root and superficial growth of a tree affected by pruning?

5.—Give arguments for and against the use of seedling and budded citrus trees; also mention stocks commonly used.

6.—What manures are to be recommended for citrus trees, and their effects?

7.—Describe the symptoms of "Mal di Goma," its causes, and remedial treatment.

8.—Give the more important scales infesting citrus trees, and any particulars you know about them (treatment not required).

APICULTURE.

1.—Describe the South African Honey Bee as completely as possible. 15

2.—How would you transfer a colony from an ordinary box to a standard frame hive? 12

3.—What are the essentials of a standard frame hive? Describe the Danzenbaker. 10

4.—Give briefly spring, summer, autumn and winter treatment in the Apiary. 15

5.—What is (1) Extracted, (2) Run, and (3) Comb Honey? Compare the advantages and disadvantages in the production of each. 15

6.—A colony is queenless. On September 1st a fertile queen is introduced. On what date may we expect to find capped worker cells from the introduced queen? How would you introduce? 8

7.—Define (1) prime swarm, (2) after swarm, (3) drone, (4) drone trap, (5) virgin queen, (6) laying worker. What do you know of each? 15

8.—Discuss the advantages of bee-keeping from a farmer's point of view.

BOOKKEEPING.

(Three questions to be attempted, including the last.)

1.—What does the balance of the Cash Account represent, and how may its accuracy be tested in real business? 20

2.—What is a "Trial Balance" and of what use is it? 20

3.—Supposing the stock in hand is over-valued at the end of one year's trading, what effect will it have on the next year's accounts? 30

4.—Post the following entries, made in the Rough Book, into the Ledger, and close the Accounts at the end of the quarter's trading, drawing out a Balance Sheet:—

1908.	£
March 1—Began business with cash	1,500
„ 1—Bought Cattle from A. Brown, worth	300
„ 1—Bought Hay, Corn, etc., from C. Davies, worth	250
„ 1—Bought Implements from E. Fairhurst, worth	140
„ 26—Sold Hay to A. Brown	165
April 10—Sold Cattle for Cash	100
„ 21—Bought Wheat Seed from C. Davies	10
June 9—Paid A. Brown	250
„ 30—Paid for Rent	230
„ 30—Paid for Wages	160
„ 30—Valuation of Cattle	300
„ 30 „ Implements	120
„ 30 „ Hay and Corn in Stock	175
	130

MENSURATION AND LAND SURVEYING.

1.—Find the area in acres, etc., of a rectangular field, whose length is 10.52 ch. and breadth 7.63 ch.? 40

2.—In measuring a field of four straight boundaries, its diagonal is ascertained to be 475 lks., and the perpendiculars upon the diagonal from the opposite corners 360 and 225 lks. respectively. Required, the area of the field in acres, etc. 40

3.—The surface of a circular reservoir is an acre; what is the radius of the circle in yards? 40

4.—What is the area of a circular plot of land whose diameter is 3 chains? Give the answer in acres, roods and perches. 40

5.—A rectangular tank contains 294.25 c. ft.; its length is 9.75 ft. and breadth 6 ft. Find its depth. 30

6.—On the plan given, draw in pencil the lines it would be necessary to run to enable you to make a complete survey with the chain and cross-staff. How would you set about to find its area? 50

7.—Draw a plan and find the area of a field from the following entry in a field book:—

	to E	
	240	40 to F
To D 50	200	
	120	80 to C
	90	20 to B
	From A	

50

8.—How would you lay out a field in the form of a rectangular of 10 acres in area, with one side three times as long as the other? 50

TROPICAL AGRICULTURE.

1.—How would you propose to exploit the new market for starch-producing crops opened by the establishment of a starch-factory at the Umgeni?

2.—An effort is being made by local manufacturers to meet the internal demand for vegetable oils and soaps, and co-operation on the part of the agricultural community is desired. What recommendations could you offer in this connection to coast and midland farmers respectively?

3.—Extensive plantations of Agave and Fourcroyia have been established on the Natal coast with varying results. To what precautions would you attribute the success attending the efforts of certain planters? Endeavour to find reasons for some marked failures.

4.—Pineapples have been successfully exported to the London markets, and an extension of the area planted with this crop is to be expected. Describe approved methods of propagation and cultivation.

5.—What is the source of Manila Hemp? How would you prepare the raw product for shipment?

6.—Species of Hemp ("Sangu") are indigenous to South Africa. Describe a suitable system of cultivation for this crop grown (*a*) for seed, (*b*) for fibre.

7.—Discuss the prospects for profitable cotton cultivation in Natal.

8.—Give an account of the commercial products derivable from Cassava.

Farm Mechanics.

1.—Define the power-units employed in descriptive mechanics.

2.—How would you ascertain the practically available power developed by (*a*) water-wheels; (*b*) rams; and (*c*) turbines?

3.—What precautions should be observed in the employment of leather-belting for the transmission of power?

4.—Account for the fact that the exposure of milch-cows and fat stock to cold rains leads to a loss of milk and live weight respectively.

5.—Discuss the place of the windmill in South African agriculture.

6.—Describe the relative advantages of the walking and sulky ploughs.

7.—How would you proceed to re-set a worn plough-share?

8.—Compare the average working costs per H.P. of steam and oil-engines.

Agricultural Bacteriology.

1.—How do bacteria increase in numbers? What external influences affect the rate of increase? Knowing these facts how would you treat milk before sending it long distances to a creamery or consuming centre? 30

2.—What precautions ought to be observed in connection with the dairy and milch cows to ensure against bacterial infection of the milk? 30

3.—Give the average composition of cow's milk and state which of the ingredients are attacked by bacteria. 35

4.—Describe the work of the lactic-acid bacteria. What is their optimum temperature? What is the value of the work performed by these organisms? 35

5.—What is a "starter"? Under what circumstances is it advisable to use "starters" for cream ripening? What is a pure culture "starter," and how does it influence the butter? 20

6.—What organisms may induce rancidity in butter? Compare them with the lactic-acid bacteria as regards (*a*) reproduction, (*b*) work, (*c*) mode of life. 30

7.—Explain the following:—"Absolute sterilisation," "intermittent sterilisation," "pasteurisation," "disinfectant," "antiseptic." 20

8.—What work is performed by enzymes? Name one vegetable enzyme, three animal enzymes, and the two enzymes in milk. 20

ECONOMIC ENTOMOLOGY.

1.—Sketch and name the mouthparts of a cockroach. How does the structure of the mouthparts of insects and insect larvae, which damage crops, affect the mode of controlling the pests? 30

2.—Give a short account of the life histories and distribution of the red and brown locusts. What are the best methods of treating these insects to prevent injury to crops? 30

3.—Describe in some detail the pests which attack growing mealies. Give notes in connection with their extermination and the prevention of their attacks. 35

4.—What do you know about the fruit fly? Name the plant it attacks, and describe the methods you might adopt to prevent its ravages. 20

5.—Write a concise description of the insects of the order *Coleoptera*, which attack stored grain, *e.g.*, mealies, Kafir corn, beans. How would you deal with these pests? 35

6.—Enter fully into the economic importance of the Natal codling moth and the true codling moth. State how you would prevent their attacks. 25

7.—State all you know concerning the lucerne caterpillar. 25

8.—Sketch and describe the structure of a typical insect, *e.g.*, the common cockroach. 25

ADVANCED AGRICULTURAL CHEMISTRY.

1.—What is meant by "weathering" of rocks and stones? Name the agents that induce weathering and explain their action.

2.—Which three elements of plant food are of most importance from the point of view of manuring? Indicate the approximate quantity of each that is removed from an acre of land by the growth of an average crop of wheat, swedes, barley, and clover.

3.—Give examples of various waste materials from manufacturing processes which are employed as fertilizers, stating their composition and character.

4.—What are the conditions of soil and climate which should be considered before deciding whether to use superphosphate or basic slag as a phosphatic manure?

5.—Compare the effects of nitrate of soda as a nitrogenous manure



EXPORT OF CITRUS FRUITS.—III.

Stacks of Trays, packed with Naartjes, ready for lidding and binding together with hoop-iron.

(See "Traffics and Discoveries.")

with those of sulphate of ammonia, indicating the crop and soils for which one or the other is more suitable.

6.—What impurities might you expect to find—

(*a*) in ammonia sulphate?

(*b*) in nitrate of soda?

How would you detect the presence of the impurity in ammonium sulphate with the simple reagents possessed by any farmer? For what crops would you be justified in using impure nitrate, and why?

7.—Explain fully the reasons for applying some fertilizers at a different time of year to others. Give examples and instances.

8.—When buying consignments of (*a*) bone dust, (*b*) basic slag, what are the chief points to be taken into consideration?

Vegetable Pathology.

1.—Clasify the species and varieties of the "rust" organism occurring as pests of staple crops in South Africa.

2.—To what characters do you ascribe the greater degree of resistance to rust infection offered by such a type of oats as the Algerian?

3.—Describe any peculiarities in the life-history of the "maize-smut" organism which lends additional gravity to the prevalence of this disease.

4.—Why are the methods of seed-treatment, successfully employed in the case of "smut" and "bunt," inapplicable in the case of "rust"? Can you suggest alternative measures of prevention?

5.—Give an account of structures associated with the "resting" or winter stages in the life-history of fungoid cereal diseases.

6.—Describe any fungus in tropical climates responsible for the disease known as "sleeper-rot" in sawn timber.

Prize Giving.

A prize giving was held on the 14th June, when His Excellency the Governor of Natal graciously presented the certificates and awards. The following report was submitted by the writer:—

On an occasion like the present, an opportunity occurs for the discussion of not more than one of the many aspects of the educational problem, for which we would desire to secure your consideration. Speaking at the birth of a new dominion within the British Empire, one would urge that among the forces which must go to make the South African nation really great, industrial education, or special training for vocations, is destined to play an all-important part. If ever there was a people and an age that needed the higher education, we are that people in South Africa, and we live in that age. I would therefore crave your indulgence for a brief review of our hopes and aims, the substance and projected machinery for equipping the rising generation of the agricul-

tural community with the weapons of commercial warfare. South Africa is already fighting to secure and maintain a foothold with the products of her soil on the markets of the world, and it would be suicidal to ignore the fact that compared with the opportunities afforded in Europe and America for acquiring knowledge and skill in our productive industries, the work now being done in South Africa is strikingly and painfully inadequate. Nor can it be said that we are without the means to give effect to our wishes in this respect if only we wish sufficiently strenuously—indeed, in these days we shall lack nothing to enable us to do anything, unless, indeed, it be the inspiration. Living in an agricultural community, with agricultural interests predominant, the case is one for active organisation justifying the financial support necessary to the conduct of our work. There is too little of what Matthew Arnold was wont to call the "geist" of education—a large outlook and understanding, a recognition of what is required from our university, and from our secondary and primary schools. Brested's charge still unfortunately holds good even in South Africa, that "a public school is one which excludes all that could fit a man for standing behind a counter." Culture is barren unless applied to forwarding the world's work, and the problem before us is to obtain the universal recognition of the necessity of special education for every form of industrial life. We need a wider diffusion of industrial intelligence as a foundation for the highest technical success, and this can only be acquired in connection with the general system of education into which it should enter as an integral part from the beginning. "The latest philosophy of education reinforces the demands of productive industry by showing that that which fits a child best for his place in the world as a producer, tends to his own highest development physically, intellectually, and morally." aldane, when fighting the battle of middle class education as a means of wresting from the Germans Britain's lost supremacy in the manufacture of iron and steel, urged that courage, energy, and enterprise are in these modern days of little more avail against the weapons which science can put into the hands of our rivals in commerce than was the splendid fighting of the dervishes against the shrapnel and the Maxims at Omdurman. Modern agriculture lays under tribute every branch of pure science for the cheapening of cost of production. Without the assistance of applied science our agriculturists go unarmed to the battle of the markets with only a forlorn hope of success.

The kingdom of Prussia alone supports 259 schools of agriculture, attended by 10,000 pupils, and 1,000 other schools where instruction in agriculture is given. South Africa has at the moment two schools of agriculture, with a total accommodation for 100 students, while a third is to be opened at Potchefstroom within the next few months. The double aim of the German educational system—pure culture on the

one hand, and on the other the application of the highest knowledge to commercial enterprise—is a growing feature of German life, and is reflected even locally by the prosperity of our internal German settlements. The Germans grudge expenditure at least as much as we do, but expenditure on technical training experience has taught them not to grudge. In South Africa it is only gradually dawning upon the inhabitants that it is not all of farming to drudge, that intelligence and culture are needed on the farm, and that the proper exercise of these qualities will yield as abundant returns in the country as in the city; that boys may choose farming as a profession, and still be as good as anybody. Let me cite a concrete example from our own experience. Four senior students came to Cedara twelve months ago, without any previous experience of agriculture, from other callings and professions. During the past month two have received appointments as Superintendents of Land Settlement Schemes in Southern Rhodesia, a third has proceeded to Cape Colony to take entire charge at an early date of Messrs. Cooper and Nephews' Experimental Farm, while a fourth remains in Natal in a responsible and lucrative position. The qualifications required in every case were such as could only be attained under a system of technical education. I may be taken to task for the fact that of these four men only one remains in the colony where he received his training, but are we not now a united South Africa?

A word as to the machinery of education. At the present time the influence of the University in South Africa on secondary and primary schools is negligible. Between the primary and public schools there is no organic connecting link. Elementary education stands by itself. University education is isolated. The problem before us is to bring university influence to bear upon our secondary education, and to provide organic continuity between our primary and so-called public schools. We require such a system whereby every branch and every stage is linked to every other, and whereby, as soon as the student gets to the higher grades, the double end pure culture on the one hand, and on the other application of knowledge to industry, is carried out to great perfection. I have hitherto unsuccessfully urged the desirability of adopting a comprehensive system of scholarships from primary to public schools, and from the latter to schools of a tertiary type, such as our own, which should with the maturity of a general scheme of education, receive status as University teaching centres.

The special training of the scholar for his vocation in life should enter into his education as an integral part from the beginning, so that should he be called to the duties of life before completing a secondary school course, he will not go hopelessly handicapped throughout his career. To teach at first the few and then wait patiently for the seed

so scattered to spread from comparatively few centres is a method which does not commend itself to those who appreciate the vital necessity of hastened progress in agricultural development, and other channels of communication are being sought in Natal. In anticipation of a resolution passed at a recent Conference of the South African Agricultural Union, elementary classes in scientific agriculture are to be organised in the primary schools of the colony upon the basis of teachers' sessions at Cedara during the winter vacation, and an invitation to assist in the organisation of similar instruction in our public schools would be welcomed from those responsible for their management. Arrangements are further being made at the request of a number of professional farmers for the establishment of a correspondence school, and in the same connection a circulating library of agricultural literature, including periodical publications, will be set on foot.

As a medium of communication, however, the residential college has so many advantages that it has come to be regarded as an almost essential complement to the experiment station; and it is a striking fact that our own institution, originally organised as a supplementary feature to the work of a system of experiment farms in Natal, has, within three years from establishment, assumed a position of the first importance among our numerous undertakings. Such an alliance renders possible a scheme of instruction based, not upon empyrical principles borrowed from other countries, but upon the results of experiments directed to the solution of local agricultural problems. The student can bring to his studies the advantages of personal observation, and the teacher is enabled to speak with the assurance derived from accumulated data and repeated confirmation of his facts. This is in fact the function of a university faculty—the bridging of the gap too frequently existing between the investigator and the practical farmer. To communicate his news in intelligible form to those by whom it is to be put to practical effect, is as much the duty of the investigator as the conduct of the experiments from which it has been derived, and frequently by no means the least difficult part of his task. It is not the function of the university to teach everything, but to teach something with the fullest authority and to defy criticism in its teaching; to teach in those faculties which it feels competent to undertake. In the work of building up a school of South African agriculture at our different stations we have now obtained a start of seven years on our students, and while the field of research has only been roughly broken, the fruits of further cultivation may be won by the combined efforts of teacher and student.

"The development of agricultural colleges will only, however, serve to bring out more clearly the fact that in the best conditions they can meet the educational requirements of only a small percentage of the agricultural community. If any reasonable body of the boys whose des-

tiny is farming, are to receive definite instruction in the principles of agriculture, it must be in schools of lower grade than the colleges. In this respect agriculture stands on just the same footing as any other branch of learning. And this is not a matter of interest and concern to the farmer alone. The enduring prosperity of our cities is inextricably bound up with the success of agriculture. Technical education has proved a sure road to commercial development and greatly increased wealth in connection with every industry which has received its bnefits. It will prove equally so as regards agriculture. The productive results derivable from the work of our agricultural colleges and experiment stations may be multiplied an hundredfold by the education of thousands of our agricultural youth in primary and secondary schools in which there is to be definite and systematic teaching of the technique and scientific principles of agriculture."

His Excellency then distributed the prizes and certificates. A full list of the successes is appended. Upon completing the distribution His Excellency said:—

I do not as a rule officially visit on occasions like the present any one school in two successive years, but I look on the case of Cedara as exceptional, as this College is an adjunct—a most important adjunct—to that agricultural development of the Colony which enables it to maintain its health and continue its growth. It would probably be going too far to say that no country can grow except by its agriculture. The exploitation of its exhaustible mineral resources has, of course, a great effect on its development during the comparatively short period that it lasts, though it seems to me that when this period occurs early in a nation's life it represents a precocious childhood giving promises that may not afterwards be fulfilled. By commerce also nations grow quickly, though, if dependent entirely on this, they are not long-lived. Witness Venice and the United Provinces of the Netherlands. Development due to manufacturing industries is the development of the adult rather than the growth of the youth. That growth—the expansion into full manhood—takes place in the agricultural stage, just as the pastoral life belongs to the childhood, and the hunter's to the infancy of national existence. And by agriculture the youth of nations can be indefinitely extended. It is the elixir of national life, making nations long-lived. For over 2,000 years the people of the Pharoahs tilled the banks of the Nile. For more than thirty centuries the Chinese have cultivated the fields on which they still raise their crops of corn and rice. Rome only commenced to decay when, instead of producing its own food, it imported slave-grown corn from Sicily, Egypt, and Africa.

Some people think that the inauguration of food importation has meant for Great Britain what it did for Rome—the commencement of the end. Without subscribing to this theory, we can certainly affirm

that agriculture as a national pursuit tends to virility. It is natural that it should do so. Man is a fighting animal, gaining strength by his struggles. I do not refer exclusively or even mainly to struggles with other men, but rather to fights with the elemental forces of nature. The sailor and fisherman who have to contend with winds and waves, the engineer who controls the great forces of gravity and pressure, and equally the agriculturist who struggles with the earth and forces it to yield its fruit for his use, are essentially fighting men, and the nation that has a large proportion of them is one that need not fear for its future. The work of this College is to teach the youth of this Colony to struggle for mastery with the earth, and it is because I believe that this is well taught that it gives me so much pleasure to take part in these annual meetings.

I congratulate Mr. Sawer on the extension of the school's work as evidenced by the report he has read to us, and the new prospectus that he is shortly to publish. I congratulate the students on having taken up a manly life which will strengthen the Colony, and I wish them all prosperity in that life.

His Lordship the Bishop proposed votes of thanks to the Governor and to Mr. Sawer, and, respecting the former, he said that while the people of the Colony as a whole would rejoice that a Union of South Africa had been accomplished, yet it would regret one of its consequences, and that was their severance from one who had been so able and so splendid a representative of the King during the time he had been the Governor of the Colony.

This short speech was greeted with loud applause. Cheers were raised for His Excellency, and the proceedings terminated, the visitors leaving shortly afterwards to return to the City.

Following is the prize list:—

Elementary Subjects.

Study of Breeds: 1, J C Otto; 2, C H Lamb.
Staple Crops: 1, A P Jamieson; 2, C H Lamb.
Elementary Chemistry: 1, J C Otto; 2, W A Welshman.
Mensuration and Surveying: 1, N J Hays; 2, C H Lamb.
Farm Bookkeeping: 1, G H Simmons; 2, N J Hays.
Agricultural Botany: 1, T B Fletcher; 2, J C Otto.
Plant Physiology: 1, J C Otto; 2, A P Jamieson.
Forestry: 1, T B Fletcher; 2, J C Otto.
Apiculture: 1, F H Mason; 2, T B Fletcher.
Horticulture: 1, J C Otto; 2, A P Jamieson.
Dairy Theory: 1, J C Otto, 2, A P Jamieson.
Veterinary Science: 1, J C Otto; 2, W A Welshman.

Advanced Subjects.

Economic Entomology: 1, T B Fletcher; 2, J C Otto.
Agricultural Bacteriology: 1, J C Otto; 2, T B Fletcher.
Vegetable Pathology: 1, J C Otto; 2, W A Welshman.
Tropical Agriculture: 1, W A Welshman; 2, C H Lamb.
Farm Mechanics: 1, A P Jamieson; 2, C H Lamb.
Advanced Chemistry: 1, J C Otto; 2, A P Jamieson.

Special Prizes.

Farriery: F T Nicholson.
General Application: C J Glen.
Grand Aggregate: J C Otto.
Highest Aggregate obtained by Freshman: H G Whelan.

Vacation Course for Schoolmasters.

The month of July will be devoted to the purposes of a Vacation Course for Head and Assistant Masters from the Government Schools, of whom nineteen have entered their names for residence. Opportunity is to be found in this course for the establishmnt of a definite scheme of instruction in the elementary principles of scientific agriculture, as a permanent feature in the syllabus of the primary schools. Further particulars of this innovation will be provided in a later report; in the interim, however, it may be stated that it is hoped to establish small gardens, orchards and plantations for demonstration purposes in the immediate neighbourhood of the different school buildings.

Appointment of a Wool Expert.

The appointment of a demonstrator, Mr. T. T. McCall, to afford expert instruction in the management and breeding of wool sheep, shearing, wool-sorting and classing, etc., meets a long-felt want at our School for special training in this subject. Arrangements are also being made for demonstrations by Mr. McCall during the shearing seasons in all our wool districts, particulars of which can be obtained upon application to the writer.

The Analytical Laboratory.

The Chemist, Mr. W. R. S. Ladell, reports for May and June, that during these months several interesting investigations were undertaken, among the most important of which being the examination of tar obtained by distilling wattle wood. The wood of the wattle tree has long been a waste product, possessing very little market value. The wood, perhaps, is cut up and sold for fuel, pulped to form cellulose material for paper-making, or is burned either in such a way as to drive off the volatile matter, leaving a residue of wood charcoal, or completely, in order to obtain the ash, which being rich in potash, may be used as a

fertilizer. The profit from the production of wattle bark is usually so good that the utilisation of the wood as a bye-product is considered of little importance, but to the business man any proposition showing how the wood may be used in a really profitable manner must commend itself.

A certain firm has been experimenting in distilling wattle wood, and among the products of distillation a tar is obtained which should prove to be of good commercial value. A preliminary examination of the tar gave the following results.

A rough fractionation yielded per 100 c.c. tar.

Pitch—65 grms.

Aqueous liquid and yellow oil—distilling below 100 deg. c—17 c.c.

Heavy yellow oil—distilling 110 deg. to 181 deg. — 10 c.c.

Orange coloured oil—distilling 181 deg. to 220 deg. —7c.c.

The oily products were further separated into 14 fractions. Some of these were found to be the same and were therefore mixed together.

The chief products were then; per 100 c.c. tar.

Boiling below 107 deg. c.

Light yellow oil—2 c.c.

Watery liquid—3.5 c.c.

Boiling 190 deg.—210 deg. c.

Orange coloured oil—9 c.c.

(Specific Gravity, 1.0482 15.5|15.5 deg.)

Boiling 210 deg. c.—230 deg. c.

Brown oil—8 c.c.

(Specific gravity, 1.0676 at 15.5|15.5 deg. c.)

These oils appear to be a mixture of phenolic and oxyphenolic compounds with hydrocarbons.

An investigation of the actual chemical constituents of the tar is being proceeded with, but it will probably be some time before any definite results are obtained. Experiments on the distillation of wattle wood will be started shortly at Cedara.

Some wattle bark samples from the Midlands of Natal gave the following results:—

	Total Soluble Solids. per cent.	Tannins. per cent.	Non-Tannins. per cent.
No. 1	38·2	22·2	16·0
No. 2	51·2	33·6	17·6
No. 3	50·6	31·9	18·7
No. 4	43·7	25·8	17·9
No. 5	43·3	26·5	16·8
No. 6	40·8	22·6	18·2
No. 7	45·2	25·6	19·6



A BLOOD-MANURE FACTORY.—I.

View of the Packing-Shed at Mr. Merritt's Establishment.

(See "Traffics and Discoveries.")

A sample of clay suitable for brick-making analysed as follows:—

	Per cent.	Per cent. on Dry Material.
Moisture	4·3	—
Silica and Sand	78·8	82·3
Alumina	9·0	9·4
Iron Oxide	4·4	4·6
Unestimated	3·5	—

A mixture of bone dust with offal was submitted for analysis. The results showed its composition to be little different from ordinary powdered bones, except that the content of organic matter was somewhat higher.

	Per cent.
* Moisture and Organic Matter	40·0
Calcium Phosphate...	51·3
† Calcium Carbonate, etc.	7·9
Sand	0·8

* Containing Nitrogen 4·2 per cent., equivalent to 5·1 per cent. of Ammonia.
† Containing Lime 3·2 per cent.

Conservation of Crown Forests.

The Chief Forest Officer, Mr. G. H. Davies, reviews work in the Crown Forests during June as follows:—

Forester Chilvers states that he is still unable to obtain labour for the clearance of the boundaries necessary at Ingeli. He will have to go and look for labourers in the locations. He and all Foresters have been making fire-breaks during the month. Forester Fernando having added another twelve miles of this to his work in May, besides making the plantations safe at Emkazeni. The annual protection from fire is showing noticeable results in the Ingwangwane forest district since 1903, and, coupled with the prevention of Native cultivation, is producing a dense growth of sagewood and other shrubs along the edges and in the "bays" of forests. These are the precursors of high forest trees, which will once more take possession of the ground from which they were driven by fire, axe and the hoe of the Native.

Within the forests, also, the conservative system of marking trees for sale instead of leaving selection to the purchasers is beginning to tell, and the ringing of unsaleable trees that now overshade the ground —but which would be the only trees left by the uncontrolled wood-cutter in the neighbourhood of his pits—will give the young trees and seedlings access to light and air. This process was authorised by you since my last report, and Forester Fernando is already engaged in giving effect to it in Sections "A" and "B," Xalingena. The result should be noticeable amongst the seedlings a few months after the ringing has

killed the leaves and destroyed the excessive canopy. I can rely upon Forester Fernando's caution in this matter, as I had to insist upon a heavier marking of the sections than he was willing to make, and to point out, as Mr. J. Storr-Lister, the Chief Conservator, Cape Colony, pointed out to me, the great recuperative power of our natural forests.

Besides the effects produced by bad treatment in the past, timber-poverty occurs in parts of forests through natural causes: lack of drainage or soil, or quality of soil—practically irremediable—and the effect of the vicious circle referred to in my last report. This latter natural cause of failure is temporary, and the cycle of poverty can be broken through in most cases by the destruction of the old trees; but there are places in most forests where it has prevailed for so long a period that no seedlings of timber trees are to be found within large areas. Natural regeneration would here be too slow, and the removal of the excessive shade requires to be supplemented by sowing or planting. Foresters in charge of worked sections should do this wherever seedlings are scarce: for sowing, nothing is needed but the habit of picking up seed wherever it is plentiful and heeling it in where plants are scarce—a habit easily acquired by a Forester interested in the improvement of his sections, and taking no time to speak of in proportion to its value. For transplanting in this connection a small sharp trowel is required, and the transfer of seedlings from places where they are numerous to those where they are scarce is best done in December and January, though generally successful also in earlier and later months.

Writing of naturally poor forest, we have an example in the Emkazeni, of Forester Fernando's district. The Forester forwards with his report for June a table showing the estimated yield of an acre of this bush. Counting reserved species only, he totalled 1,083 cubic feet, and, pricing it all at 3d. only to allow a margin for safety, he makes the value of an acre in timber to be £13 10s. 9d. In practical working, however, and for the whole of the forest—the poorest in the Ingwangwane unit—I think that £8 per acre for about 400 acres of bush would be a safe estimate, and this total valuation of £3,200 would have to be divided by a long rotation to obtain the annual income under full exploitation. This forest is not exactly "scrub," as the Forester terms it, but it is what I term "low-forest," and his calculation is welcome as showing what is being given away when bush is alienated at ten shillings the acre on long credit.

Forester Chilvers reports that sawyers his way consider equines—horses, mules and donkeys—will be useless for bush work. They have not tried them, and had better do so as fast as they can if they do not want to get "left." Ox transport is dead, and the change is only a question of management—even if a few more donkeys are required to do the

work of oxen. At 'Ngomi, Forester Foster considers that the repair of the road to Louwsburg is necessary for the transport of forest timber and produce. He has been prevented by other duties from completing the marking of the section, but will finish it during the current month. About a week's loss of time was caused by the trial of one of his Native guards for murder.

Since the date of his monthly report Forester Foster has had to deal with a very large case of poaching. Acting on information supplied by a Native, he and Trooper Arnott, N.P., with a Native constable, succeeded in surprising a party of about a hundred armed Natives and one or two Europeans. They captured one of the latter and five Natives, and brought them up to the Police Camp above 'Ngomi, where Sub-Inspector Lewis, N.P., obtained from them data sufficient to implicate another European, a Native chief, and forty-two others. Game had already been killed, but the hunt—which was in a remote part of the forest—had only just commenced, and was "nipped in the bud" by the prompt action of the Forester and police. The buck at 'Ngomi keep to the lower parts of the forest at this season. This is probably for warmth, though Forester Purser, at Bulwer, states that, owing to the mild weather, bushbuck do not come out to sun themselves as usual in winter. This month, however, it will be a "different story." The Ingeli forests must be swarming with game, as Forester Chilvers himself saw fifteen bushbuck when merely on patrol. He came across a portion of a young doe under a tree on which an eagle perched, and found several skulls of bluebuck and of lambs near an eagle's nest. I recommend him to shoot a few eagles: sportsmen can do the thinning of buck with some discrimination as to sex.

At Giant's Castle Forester Symons expects the eland to begin calving during the current month, and is making preparations to capture. He has been trapping vermin successfully, but again was unfortunate enough to take buck in the traps—two oribi and a vaal rhebok. Forester Moller reports an eland bull on the Berg above Normandien—possibly a strayer from Giant's Castle. Forester Ball states that vaal rhebok come into Natal from the O.R.C. at this time of year at Olivier's Hoek, where he also reports partridges as being plentiful.

Forester Symons has made a careful inspection of the Bushman paintings in the Giant's Castle Reserve for the information of H.E. the Governor, and his very complete report has been sent up to you. Many of these designs have been wantonly defaced, but detection is almost impossible; though the offenders, if discovered, could be prosecuted for damaging public property as far as the Game Reserve is concerned. We can only keep a watch upon visitors likely to prove vandals, and hope that the schoolmaster may succeed in instilling a proper respect for historical remains in the "rising generation."

Contraventions of Proclamation 58, 1903, have been rather frequent during June, especially in the Ingwangwane district, in which cases brought up produced fines totalling £7 5s. That district is the most exposed to Native depredations outside of Zululand, where Natives practically have the free run of the Crown Forests Reserves. Forester Eyles, of Imbizana, in Alfred County, obtained fines amounting to £9, besides sums ordered to be paid into forest revenue for damage done.

INDIGENOUS TIMBERS.

An interesting report has been received from Prof. W. R. Dunstan, M.A., F.R.S., Director of the Imperial Institute, upon certain blocks of timber forwarded for examination. The timbers which are the subject of this report were forwarded for examination to the Imperial Institute by this Division through the Commercial Agent for Natal, with letter dated the 6th January, 1909.

The specimens consisted of small blocks of wood representing nine varieties of timber from the Zululand forests. It was suggested that on account of their hardness the woods might be suitable for the manufacture of pipes or for paving purposes.

The woods have been submitted for examination with reference to their general characters to an expert, who has furnished the following report:—

No. 1. Assegai Wood (*Curtisea faginea*).—This is a rather hard, close-grained wood. The heart-wood is reddish-brown, with black streaks, and the sap-wood light brown. The wood is hard to saw, plane and turn, but yields a smooth surface and takes a good polish readily. It does not take nails.

No. 2. Sneezewood (*Ptaeroxylon utile*).—This is a close-grained, brownish-white or cream-coloured wood. It is easy to saw and turn, and takes a good polish, but is hard to plane, as the grain picks up, making it difficult to get a smooth surface. It does not take nails. The wood should be useful in turnery for any purpose where its plain appearance is immaterial.

No. 3. Wild Sage (*Buddleia salvifolia*).—This is a rather open-grained wood of dark-brownish white colour and very poor appearance. It saws and turns easily, and takes nails readily. It polishes moderately, but the resulting appearance is not satisfactory.

No. 4. Lemon Wood (*Xylosma monospara*).—This is a light, lemon-coloured wood, and has rather an effective appearance in parts owing to the "silver grain." It is easy to saw, turn and plane, and takes a good polish. It takes nails moderately well.

No. 5. Thorn Pear? (*Scolopia Zeyheri*?).—This is a rather cross-grained wood of reddish-brown colour. It takes a medium polish, and saws, turns and planes easily, but rips out in the knotty places during planing. It will not take nails. This wood is of little value.

No. 6. Wild Olive (*Olea sp.*).—This is a light coloured cross-grained wood, which takes a fairly good polish. It turns easily, but is hard to saw. In planing the grain picks up and makes it impossible to get a good surface. The wood will not take nails.

No. 7. Black Ironwood, or Wild Olive (*Olea sp.*).—This wood resembles walnut in appearance, but is rather lighter in colour. It is hard to saw, turn and plane, and will not take nails. It takes a good finish when polished, and is the best of the present specimens in appearance. This timber would make a good substitute for walnut, but it is harder to work, and to give it a good finish requires much labour.

No. 8. White Pear (*Apodytes dimidiata*).—This is a close-grained, streaked wood of a greyish-brown colour. It is hard to saw, but easy to turn and plane, and takes a medium polish. It does not take nails.

No. 9. *Mkokuse*.—This is a light, reddish-brown, close-grained wood. It saws moderately hard, but turns easily. It planes easily, but with an indifferent result. It takes a good polish, but loses its faint red tinge in the process. It will not take nails.

Conclusions.

It seems improbable that these woods could be used for pipe-making in Europe, as they are all light coloured and appear to crack readily. Nearly all the specimens cracked after their receipt at the Imperial Institute, although they were not kept in a particularly warm place.

As regards their possible use for paving and other purposes, the results of the technical examination show that the specimens are of very ordinary quality, and it is impossible to recommend the exportation of similar material to Europe, where it would have to compete with the superior woods already on the market. These timbers would, however, be useful in Natal for a variety of purposes.

It may be of interest to mention that specimens of four of the above timbers, viz., "Assegai Wood," "Sneezewood," "Black Ironwood," and "White Pear," were received at the Imperial Institute from Cape Colony in 1899, and an account of their mechanical and working properties is given in the article on "Colonial Timbers" in "Technical Reports and Scientific Papers" (1903), Part I., pages 268 to 280. The mechanical properties of "White Pear" and "Sneezewood" from Natal are also recorded in the same volume, page 291; the botanical source of the former wood was then given as *Pterocelastrus rostratus*.

Afforestation.

The Chief Afforestation Officer, Mr. F. T. Stayner, reports that the exceptionally late rains experienced in May rather altered the usual routine, replacing gaps in the season's planting was carried out and some

ornamental planting done, the usual fire break work being held over as the grass was abnormally green. Even at the time of writing (July 1st) it does not burn well where the stock have been grazing. The main portion of the fire breaks are now made and will be completed in the course of the next few weeks. The Cedara plantation will then be thoroughly safe from fires approaching from the outside, but the risk of internal conflagrations remains as before, and unless further expenditure is authorised must do so till the trees have themselves cleaned the rank weeds and grass undergrowth now present. A hut has been erected in a commanding position and a native guard stationed there for night watch duty. The seed of *Caryophyllus aromaticus* (clove) received from Zanzibar has been sown at Winkel Spruit and Empangeni, but I am dubious as to the result as the clove is distinctly tropical in its requirements and the temperature at Empangeni drops considerably in winter, as low a record as 42 degs., which occurred on the night of the 17th June, having been already shown this year. No less than 6·97 inches of rain fell at Empangeni during May. During the period under review I have attended three agricultural shows and made several advisory visits, while numerous letters giving advice upon afforestation have been sent from my office. It may be premature to anticipate a revival in planting, but inquiries as to suitable species to plant and with regard to transplants for sale have been much more numerous than previous years. The plantations are now at an instructive stage, which makes personal visits on the part of intending planters of much more avail than anything that can be done by letter. The public do not seem to be taking very great advantage of the new tariff for seeds, *viz.*, 6d. per packet, yet the fact that the Government are offering seeds at this extremely low rate in order to encourage afforestation is evidently not yet known. The packets thus sent out are, of course, commensurate in size with the prime cost of seed, but a 6d. packet of Eucalyptus, for instance, may be depended on to provide several hundred transplants.

The first portion of my 1909 Lecture Course at the School of Agriculture was completed by the end of May, and of the students who sat for the examination on June 2nd, no less than 18, or 47 per cent., passed. At Empangeni the burning of fire brands, harvesting catch crops (mealies, ground nuts, etc.), and cleaning plantations, has absorbed most of the labour, some purning and thinning having been also accomplished. Forester Tarboton obtained a log of *Barringtonia racemosa* for trial by the Lion Match Company, and it is to be regretted that the report has not been favourable, as a quantity of this wood is available. So far nothing equal to the White Poplar has been found in the Colony.

Olea foveoelata was among the indigenous seeds sent in recently, and I passed a few of them on to the Chemist for trial with respect to

their oil contents, as they belong to the Olive family. His report, however, shows but a meagre quantity.

Chicory.

The following notes are offered in response to numerous enquiries recently received, as to the approved methods of cultivation for chicory. Chicory (*Cichorum intybus*) is valuable both as fodder plant for cattle and sheep, and for the dried root which is used to mix with coffee. It may be grown as a dry land crop, but responds handsomely to irrigation, by which the yield may be increased by 50 to 100 per cent. No commercial trial of the crop has so far been made in Natal, but in a variety test at Cedara yields of roots were obtained ranging from 2,000 to 9,800 lbs. per acre, the latter being harvested from a variety known as Garton's Giant. A cross between "Brunswick" and "Silesian" is said to have been particularly successful in Cape Colony. The Cedara yield is a comparatively low one, more especially when the heavy manuring to which the soil has been subjected previous to planting the crop is taken into consideration: a dressing of 10 tons of kraal manure in addition to 200 lbs. of superphosphate and 50 lbs. of potash chloride having been applied. A liberal supply of phosphates and potash are of importance to this crop; consequently, until further local experiments have been conducted, it will be desirable to manure with the fertilisers mentioned above, omitting the kraal manure.

The crop is one which does not lend itself to constant cultivation on the same soil; where this is practised both quality and yield will be reduced. A rotation embracing maize and some legume is recommended. A soil that is too wet for other crops will be equally useless for chicory, which prefers a moderately dry and somewhat sandy soil. Deep ploughing is essential, whilst subsoiling to a depth of 12 inches should be practised if possible.

With the advent of the first spring rains the seed should be sown in 15-inch drills, and the plants thinned out, when about 4 inches high, to 9 inches in the row. About 2 pounds of seed per acre will be required. A "Planet Jr." drill, which can be obtained in Maritzburg, will be found a most suitable implement for planting.

During growth all weeds should be kept down by constant shallow cultivation, and all flowering stems should be removed as they appear. The crop is ready to harvest "when the lower leaves are turning yellow and the root breaks across with a short fracture and is full of milky juice, not dry and fibrous, in which case the chicory will be gritty and tasteless. Lift the roots in dry weather so as to keep them clean; cut the tops off, but not so low that they will bleed." In Cape Colony the price for ripe fresh roots up to 50s. per ton at the factory.

To grow the crop successfully considerable care and attention is required, and "chicory must not be regarded as a crop from which fortunes are suddenly to be made; but it is certainly worth cultivating where conditions are suitable. Where chicory is found by experiment or previous experience to answer, it is of the utmost importance to farmer and manufacturer alike to arrange and insure that a regular supply will be forthcoming.

Without this the industry of chicory drying and grinding is hopeless and impossible, as witness the fact that factories have for months past been idle, and, unless special inducements offer, and a regular and considerable supply be guaranteed, will not recommence work. Prospective growers would therefore do well to come to some arrangement with manufacturers previous to embarking on the cultivation of chicory, and it would seem particularly desirable that a number combine, so as to furnish the necessary amount and to distribute the supply over a longer time." The foregoing, taken from the *Cape Agricultural Journal*, will serve as a note of warning regarding the danger of investing capital and enterprise in the growing of chicory without first securing guarantee that there is an assured market for the roots.

E. R. SAWER,
Director of Agriculture and Forestry.

20th July, 1909.

Heavy winter layers are generally poor summer layers, and *vice versa*.

Mr. George Ross has been appointed, under Section 6 of the Agricultural Development Act of 1904, to be a member of the Land Board, for a period of three years from the 1st July, 1909.

Rules and Regulations for the disposal of Crown Lands in Zululand, other than Crown Reserves, Special Reserves, and Township Reserves, were published in the *Government Gazette* of the 29th June.



A BLOOD-MANURE FACTORY.—II.

The Drying-Grounds, where the manure, after having been cooked, is spread out to dry.

(See "Traffics and Discoveries.")

"Traffics and Discoveries."

NOTES AND INTERVIEWS BY OUR TRAVELLING COMMISSIONER.

III.—WHAT GOVERNMENT IS DOING FOR THE CITRUS FRUIT INDUSTRY.

It is now a considerable time ago since the first reference to the possibility of establishing an export trade in citrus fruits to England was made in the pages of the *Agricultural Journal*. Who first thought of the idea history does not relate; probably, as is the case with many ventures of this kind, no one person can be credited with the discovery of Natal's potentialities in the growing of citrus fruits for export; but at any rate the idea has grown and has materialised until now, in the third year only of experimenting, something like cases are being despatched weekly to the great oversea market, and the prospects for future years are perhaps everything that could be desired.

Whoever the person or persons may be who were responsible for the conception of the idea of exporting citrus fruits, there is no doubt that it is Mr. Fuller's energy and expert knowledge that has made the export of citrus fruits the success it is. It is one thing to have possibilities; it is another thing to take advantage of them; it is still another matter to take advanage of them to the full. The possibilities we have; Mr. Fuller and his staff have taken advantage of them for the Colony, proving that they are sound possibilities; it remains now for the Colony as a whole to take advantage of those possibilities to the full.

Casually strolling down the Point Road, Durban, where it passes the Alexandra Square, one little dreams of the busy hive that, ensconsed in the African Boating Company's building, is building up the nucleus of what will probably in the near future be one of Natal's most important lines of activity—the export of citrus fruits. From the wharf come the usual noises connected with shipping, but no sounds issue from the first floor of the African Boating Co.'s premises to mingle with those of the street and the shipping and give a clue as to what is taking place within; there is certainly usually a pile of fruit boxes in front of the building, but there are piles of cases to be seen almost everywhere at the Point, and no special significance is attached to the presence of these particular piles of fruit boxes.

The meaning and the importance of the presence of these fruit boxes begins to dawn upon us when we go upstairs and behold the sight of a considerable number of girls seated at long tables and busily engaged in packing fruit in trays, of boys grading naartjes, of other boys nailing down tray-lids and trapping the trays together with iron

straps, of still more boys trundling along long narrow padded boxes filled with naartjes, of piles of trays waiting to be put on to the lift and held ready for shipment. Then we commence to realise what is happening; we begin to understand that this is really the Government Fruit Packing House which, under the direction of Mr. Claude Fuller, Chief of the Division of Entomology and Horticulture of the Department of Agriculture, is demonstrating what Natal can do in the direction of the systematic export of citrus fruits, and is laying the foundations of a big industry in the near future.

Such, at any rate, were my impressions as, one day early in July, I visited the Packing House on behalf of the readers of the *Journal*, and sought out Mr. Fuller.

"I seem to have come on an extra busy day!" I remarked, as I glanced around at the crowd of busy workers.

"Oh, no," Mr. Fuller replied; "we are like this every day almost: we are always busy down here!"

"You are having a good season, then?"

"Yes, so far as the patronage of growers is concerned——"

"The idea is being well supported, then?"

"Very well supported The fruit is coming in fast every day. You saw that pile of fruit cases outside on the pavement? Well, we have to get through that much every day, and it means a lot of overtime to do it, I can assure you! The season is not a good one for fruit, however, on account of the abundance of rain we have had."

"At what rate have you been shipping, Mr. Fuller?" I asked.

"In the first eight shipments of the season alone we shipped double the quantity of fruit that we sent during the whole of the thirteen shipments of last season."

"Do you have to reject much fruit?"

"Not as much this year as last. Growers are beginning to realise the importance of sending good fruit. We are having more rejects of oranges than of naartjes, but, of course, the naartje section of the business is by far the larger and more important."

Mr. Fuller then showed me around the establishment, commencing with the graders.

"Here you see the boxes of naartjes being opened up and the fruit graded. As you see, each grader consists of six run-ways leading from as many holes of different size (according to the grades fixed upon) in a board and emptying into these padded boxes."

"The fruit is graded by hand, then?"

"Yes, but there are four graders, and these can keep all the girls going quite well.

"When these padded boxes are full they are run across to the packers," Mr. Fuller continued. "We have ——girls packing naartjes, and they are kept going steadily."

Mr. Fuller then led the way to the packing tablss. Here the fruit was being wrapped up, each one separately, in coloured tissue paper, and neatly packed in tissue paper shavings in trays adorned with white lace paper. The "packs," of course, varied according to the grade of the fruit. The best grades were wrapped in "silver" and "gold" paper and packed in a mixture of tissue and tinsel shavings. All grades, however, looked very effective, and would make a good display in any London fruiterer's window.

"What system have you of indicating the grade of the fruit each tray contains, Mr. Fuller?" I asked.

"The grades are described on the trays by the use of such words as 'choice,' 'fancy," and so on; but the best indication of the grade is what we call the 'pack'; that is to say, the number of fruits in each tray. The number is marked on the tray. Of course, the fewer the number the larger the fruit."

"After the trays have been packed and the lids nailed on, they are, I think, strapped together with iron straps, are they not?"

"That is so—the trays are strapped together into cases or 'lugs.'"

The lidding of the trays and the strapping of them together was being done by European boys; and the same labour was employed for most of the other work. In fact, it was pleasing to see white labour employed throughout this section of the establishment.

"When the lugs are ready for shipment they are taken down on the lift to the ground floor, where you will see, directly, great piles of them waiting to be transhipped to the steamer."

In a few minutes we ourselves were down on the ground floor, where I found, as Mr. Fuller had said, large piles of cases, all ready packed for shipment. All these cases had to go by that week's boat (the shipments being, of course, made weekly), and they furnished very eloquent testimony to the energy of Mr. Fuller and his staff.

Thence we went across the road to the orange packing house. Here things were done on a very much smaller scale, as comparatively few growers are exporting oranges as yet. The oranges were not being packed in trays, as the naartjes were, but in boxes. All the fruit were being carefully graded, however, and each orange wrapped separately in coloured tissue paper.

With the visit to the orange packing house my "interview" came to an end, and I left Mr. Fuller much impressed by what I had seen and with visions of a future wherein a great packing establishment, employing hundreds of hands and dealing with millions, instead of thousands, of fruit figured largely, and when the growing of citrus fruits would be one of the greatest farm industries of the country. How near that day may be no one can prophesy, but let us hope it is not very far distant. Things sometimes move rapidly in this sub-continent.

IV.—WHERE BLOOD MANURE IS MADE.

A MORNING WITH MR. MERRITT.

Rarely, perhaps, is the truth of the saying, "It's an ill wind that blows no one any good," so wonderfully proved as it is now being in the case of East Coast Fever. To most farmers, and to the country as a whole, this fell disease has come as a curse, and to suggest that it might be of some good to individuals if not to the country is to court a general verdict that you are something of a crank, that you are a person with a distorted mental vision who can see nothing but doubtful good in things evil. Nevertheless, even in the case of such a scourge as East Coast Fever there is always someone to profit, and such a fortunate individual exists in the person of Mr. Wm. Merritt, who is turning to commercial account the actual blood of the animals that are daily being slaughtered at the Government Abattoirs in Maritzburg and Durban, drying it and turning it into a valuable nitrogenous manure.

Mr. Merritt began operations about eighteen months ago in a small experimental way at the Government Abattoir in Maritzburg, and, meeting with success, he finally decided to commence manufacturing blood manure on a large scale. Accordingly he acquired a piece of land close to Bisley Station, near Maritzburg, erected there his shed and coppers, and laid out extensive drying grounds; and it was there that I looked him up recently to see what progress he was making.

Mr. Merritt's works lie about 100 yards from the railway station, and they have the advantage of being on a lower level than the railway, so that the barrels of blood, as they are received from Maritzburg and Durban and off-loaded, can be easily rolled down the slope. The finished manure, being in the form of a clean, dry powder, is packed in sacks, which are more easily handled than barrels, so that it is not a difficult matter to get the finished product up to the railway for entraining to its destination.

When I reached Bisley I found Mr. Merritt engaged in superintending the despatch of ten tons of manure which he was sending off in fulfilment of an order from Durban, and when his task was finished we walked down together to the works.

"That ten-ton consignment looks like business!" I remarked appreciatively.

"Yes—the demand for my stuff is gradually growing as farmers are getting to know it," replied Mr. Merritt. "And I have had some good accounts, too, of it from those who have used it. Mr. ———" (mentioning the name of a well-known farmer and M.L.A. on the South Coast) "says he considers it is grand stuff for sugar cane, and I have heard from one or two other sugar-cane growers to the same effect. Of

course, there has not been sufficient time for many farmers to give it a trial, but all who have tried it for various crops that require nitrogen speak well of it. It has been found good for mealies too," and he took from his pocket and showed me a letter from an M.L.A. and well-known farmer in the Northern Districts, who stated that he had used the manure on mealies and had obtained a return at the rate of 30 muids to the acre.

"Of course, there must have been the necessary phosphates in the ground for the formation of the grain," Mr. Merritt commented, "but you can't produce big cobs on small mealies, and I expect my blood manure produced the healthy plants that are necessary if full advantage is to be taken of the other manures applied. It was a marvellous crop for that district, anyhow. Besides field crops, vegetables do well with dried blood; and, by the way, you will probably be interested to hear that my stuff keeps off white ants."

"Really?"

"Apparently so. I find—and others have told me the same thing, too—that, by applying this dried blood to rose-bushes, for instance, that are being attacked by white ants, the ants are driven off entirely."

"By the ammonia fumes, I suppose?"

"Presumably. Anyway, that's what I have found; and when I first made the discovery I made a definite experiment with a couple of posts that were infested with white ants. Around one of them I put a little heap of the manure, and very soon the ants had quite gone."

"That is very interesting," I remarked, "and I daresay those of our readers who live on the coast and keep gardens will be glad to know it."

By this time we had reached the works, and Mr. Merritt proceeded to show me around and explain the processes by which the manure is made.

"These," he commenced, "are the coppers for boiling the blood; the blood you see inside them has been cooking for hours and will soon be ready to be taken out and dried. The cooking, of course, evaporates most of the superfluous moisture in the blood."

The contents of the coppers were not good to look upon, as may be imagined, but they were less objectionable than they must have been when the raw blood and refuse was first put in, since most of the moisture had been dissipated by the cooking and there were left large masses of tough, doughy-looking stuff that was once blood, but was now well on its way to being a valuable nitrogenous manure.

"This is where the blood is dried after it has been cooked," Mr. Merritt proceeded, indicating a large drying ground. "The boys, as you see, are raking it over so as to dry it as quickly as possible. When it is properly dry it is like this," and he handed me what looked like a black, very compact cinder, as little objectionable as the moist, steaming stuff on the ground was the reverse.

"And after that?"

"Then it is either ground up small or sent off just as it is. Some farmers prefer it unground—for one thing, of course, it is cheaper in that state,—while others like to have it in the form of a powder."

Leading the way to the packing and storing shed, Mr. Merritt showed me samples of ground and unground manure, the former for all the world like coarse gunpowder. He also showed me samples of other forms of blood manure he was experimenting with: one of them of a reddish-brown colour and containing somewhat more nitrogen than the ordinary kind. These samples were prepared by a process which Mr. Merritt himself discovered, and I am consequently not at liberty to publish any details. Mr. Merritt's aim is to turn out increasingly valuable manure, and at the same time gradually to lower the price, and he is meeting with considerable success in both directions. The most popular form which his blood manure takes at present is in the rough unpowdered state, just as it leaves the drying ground, and Mr. Merritt is selling considerable quantities of this.

Mr. Merritt is carrying on various experiments with his different forms of blood manure mixed with other substances, and he hopes to produce shortly complete manures for various crops. His enterprise is commendable, and I hope to see this new South African industry go ahead largely in the future.

V.—THE "NATAL" SPRAY PEN.

Readers of the *Natal Agricultural Journal* are already aware of the existence of the "Natal" Spray Pen, invented by Mr. H. Watkins-Pitchford, Government Bacteriologist, and they had, last December, a good opportunity of studying the device for themselves, since in the issue of the *Journal* for that month there appeared a descriptive illustrated article by Mr. Pitchford himself. There is thus no need for me to endeavour to describe the invention here, nor is this my present purpose. All I want to do is to remark upon a practical demonstration of the working of the appliance which Mr. Pitchford gave just before the Durban Show and at which he very kindly invited me to be present.

The three illustrations of the pen which are published in this issue of the *Journal* give perhaps as good an idea as could be wished of the appearance and, to some extent, the method of working of the pen. From them it will be gathered that the principle of the device is the spraying of the animal by means of (*a*) a series of roof jets which account for the animal's back and top of the head, (*b*) two sets of side jets, which drench the beast's flanks, and (*c*) two sets of floor jets, which thoroughly wet the belly and under parts generally of the animal. These three series of

jets are controlled by means of three cocks (shown in the side view of the pen), and are turned on alternately so as to get full pressure on to every part of the animal. Pressure is supplied by means of a pump, which, as can be seen in the first picture, may be worked by means of ordinary horse-gear. A pressure of 30 lbs. to the square inch is the force applied (the pressure that is being developed by the pump is watched by means of a guage); a safety valve removes all possibility of a catastrophe.

At the demonstration which Mr. Pitchford gave at the beginning of the month a horse-gear attachment to the pump was used, and it gave very satisfactory results, the pressure, which was reduced, of course, by each spraying, being rapidly brought up again to the required 30 lbs. Doubtless if it were desired to put animals through very quickly a larger pump would be found preferable (a hand pump is shown on the left of the first picture), but for all ordinary purposes the 6-inch pump which was being used at the demonstration would be quite suitable. As Mr. Pitchford remarked, no great expense has to be incurred, in connection with his Spray Pen, for the pump, since many farmers have horse gear; and even if horse gear is purchased to work the spray pen the money spent on it is not expenditure involved exclusively for the pen, since the gear can be used for other purposes on the farm. Where a pen is erected by a co-operative association, or similar body of farmers, however, there would be many more cattle to be put through than in the case of a pen installed on a private farm by a single individual, and at the same time the organisation would be better able to afford the purchase of a large pump, if such were considered necessary.

The pen is not of complicated construction, nor will it be as expensive to erect as an ordinary cattle dipping tank. But the direction in which it especially commends itself to the farmer—in fact, this is the aim of the pen—is the effective way in which it drenches the animals, a recommendation which few other forms of dips or sprays can boast of. It has been called a "spray pen," but I rather think "*drench* pen" would have been more descriptive! The pen certainly leaves nothing to complain of on this score, as we found in examining each of the animals after it was put through The ears were drenched as effectively as any other part of the body, and the same can be said of the parts between the legs, as also—in the case of a couple of cows that were put through—the udder. Everywhere, as far as we could see, the hair was wet right to the actual skin—and we examined each animal very carefully. This was after about 15 to 25 seconds' spraying only, from which the effectiveness of the spray may be judged.

The effectiveness of the pen in the matter of spraying, though the principal, is not the only important point in its favour. The purchase of dipping mixtures is a consideration with most farmers; and it is in this direction also that the "Natal" Spray Pen scores, for the dip can be

used over and over again for hundreds of animals, while it keeps good for an indefinite period in the storage tank. An objection has been raised in the daily press to the effect that the jets are liable to become clogged with refuse brought in by the animals. Such clogging, however, is practically impossible, because after the dip has been used and runs from the floor of the pen through the grating it passes through a strainer, which removes all the refuse and coarse particles generally from it. Apart from this, the ends of the supply pipes in the pen are fitted with screw caps which can be removed and the pipes cleaned. No refuse can thus, even if it does manage to get into the pipes, remain long behind the jets, while no particles can secure a lodgment in the jets themselves—which are nothing more than holes bored in the pipes—on account of the pressure of the spraying fluid.

Mr. Pitchford's appliance is probably the most effective apparatus for its purpose that could be had, as the demonstration proved, and I feel sure that as it comes to be known among farmers it will be well taken up.

The Position of East Coast Fever.

LIST OF OUTBREAKS DURING JUNE-JULY.

THE Chief of the Veterinary Division (Mr. W. M. Power) furnishes the following list of outbreaks of East Coast Fever that have occurred during the period 21st June to 20th July:—

Weenen District.—Outbreak on farm "Waterfall."

Umvoti District.—Outbreaks on farms "Driefontein" (sub-division of "Pampoen Nek"), and Mr. H. R. Oellerman's portion of "Weltervreden."

Utrecht District.—Outbreak on farm "Geithoulboom."

Krantzkop District.—Outbreaks on farms "Salem" and "Krantzkop."

Umgeni District.—Outbreak among cattle of Mr. H. F. Fynn, Fox Hill.

Lion's River District.—Outbreaks among Natives' cattle on farm "Reit Vallei."

New Hanover District.—Outbreaks among Mr. Peters' cattle on farm "Spitzburg," and Mr. J. Boddy's cattle on farm "Mount Pleasant."

Ixopo District.—Outbreaks on farm "Carrot," and Location No. 6.

No record is kept of outbreaks in the following Magisterial Divisions:—The whole of the Province of Zululand, the whole of Victoria County, Umsinga, Vryheid, Ngotshe, Babanango, and Paulpietersburg.



THE "NATAL" SPRAY PEN.—I.

General View of the Pen, showing horse-gear on right and hand-gear pump on left.

(See "Traffics and Discoveries.")

Durban and Coast Agricultural Society.

NINTH ANNUAL SHOW.

A SUCCESSFUL EXHIBITION.

The Durban and Coast Society of Agriculture and Industry held their ninth Annual Show on Wednesday, Thursday, and Friday, the 7th, 8th, and 9th July, at Lord's Ground in Durban, in wet weather. Fortunately the rain did not at any time develop into a downpour, and though the weather was exceedingly unfavourable it did not prevent the judging. Owing to the unfavourable conditions, however, our representative was unable to take any photographs at the show. The Durban Show this year created another South African record, beating in point of combined entries the previous best shows held this year at Johannesburg, Port Elizabeth, and Rosebank. The entries were: General show, 1,830; dogs, 966; poultry, 987; making a total of 3,783, which was an increase of 477 over that of last year. The general exhibits were 60 below the number of last year; however, this would not have been the case had the machinery section been competitive, instead of, for the first time, non-competitive.

Judges and Stewards.

The following is a list of the judges and stewards, omitting those officiating at the sports and at the Kennel Club Show:—

Horses, Mules and Donkeys.

Thoroughbred Horess.—Judge, Hon. F. H. Schimpers, M.L.C. Stewards, Marshall, F. L. Goble, G. Macdonald, W. Greenacre, C. T. W. Swales and S. T. Amos, M.R.C.V.S.

Hackneys, Cleveland Bays, or Yorkshire Coach or Cart Horses.—Judge, F. Hutchinson, M.R.C.V.S. Stewards, C. C. Randles, J. A. Dales and Colin Wilson.

Polo Ponies.—Judge, W. M. Power, M.R.C.V.S. Stewards, J. R. Arthur and B. R. Swales.

General Horses.—Judge, W. M. Power, M.R.C.V.S. Steward, H. Sparks.

Harness Horses.—Judge, A. McNae, M.R.C.V.S. Steward, Geo. Edwards.

Saddle Horses.—Judge, F. A. Verney, M.R.C.V.S. Stewards, H. Hatchin, P. Jamieson, O. Davis, P. Piccione, P. McKenzie and F. Stayner.

Mules and Donkeys.—Judge, C. Jackson. Steward, P. Piccione.

Sheep.

Merino Sheep.—Judge, C. E. Hancock.

Shropshire Down Sheep.—Judge, H. Stedman. Steward, G. Monhaupt, junr.

Down Sheep (other than Shropshire).—Judge, H. Stedman. Steward, C. J. Glen.

Persian Sheep.—Judge, Hon. H. D. Winter. Steward, A. H. Burman.

Long Wool Sheep.—Judge, H. Stedman. Steward, W. T. Buttery.

Cross-bred and Fat Sheep.—Judges, Hon. H. D. Winter and W. J. Thompson. Stewards, H. B. Evans and W. Anderson.

Goats and Pigs.

Angora Goats.—Judges, Hon. H. D. Winter and W. J. Thompson.

Pigs.—Judge, John Marwick. Steward, F. Brown, junr.

Vehicles.

Carts, Carriages, Wagons.—Judges, W. F. Goodwin and D. Taylor, M.L.A. Steward, G. L. Dalton.

Farm Produce.

Roots and Tubers.—Judge, A. Reid.

Kafir Corn, Mealies, Samp, etc.—Judges, J. Westbrook and E. Sawer. Stewards, Marshall, F. Stevens, C.M.G.; assisting, P. G. Steber, T. Burman, S. Deane, G. W. Cooke, W. A. Bath and J. S. Fowle.

Table Fruits.—Judge, T. R. Sim. Stewards, H. Burman and W. F. Taylor.

Vegetables.—Judge, T. R. Atkinson. Stewards, F. H. Tunmer and W. C. Dawber.

Dairy and Food Classes.

Cheese and Butter.—Judge, A. Lawrence. Stewards, J. M. Wilson, A. Williamson and S. H. Chandler.

Bacon, Meals, etc.—Judge, J. J. Carugatti.

Bread, Biscuits, Sweets, Jams and Fruits.—Judge, W. Merrick.

Cordials, Syrup, or Aerated Waters.—Judge, A. Allerston.

Ale and Stout.—Judges: F. Stevens, C.M.G., and H. H. Puntan.

Rum.—Judge, H. H. Puntan.

Home-made Productions.—Judges, Mrs. E. W. Evans, Mrs. A. Henderson, Mrs. Trotter and A. Allerston. Stewards, H. B. Tremayne, G. Burns and A. Law.

Miscellaneous.

Tobacco.—Judge, E. Sawer. Stewards, W. Poynton and C. F. Glen.

Fibres, Coffee, Chicory.—Judge, E. R. Sawer.

Natal Tea.—Judge, J. M. Wilson.

Honey.—Judge, Sub-Inspector G. Stanley. Steward, W. C. E. Roberts.

Classes 387, 388, and 401-418.—Judge, John Fletcher, M.I.C.E.

Harness and Leather.—Judge, A. A. Gibson.

Horse Shoes.—Judge, S. T. Amos, M.R.C.V.S. Steward, J. M. Arthur.

The Opening.

At one o'clock the opening ceremony was performed from the grand-stand, the Show being declared to be formally opened by His Excellency the Governor (Sir Matthew Nathan), who was suitably introduced by Mr. E. W. Evans, the President of the Society. Amongst those present were the Mayor (Mr. C. Henwood), and the Hon. Marshall Campbell.

The Governor spoke as follows:—At every agricultural show that I have attended since I came to Natal, I have had to deplore the absence of cattle exhibits, and so I must to-day. Not only has East Coast Fever deprived this exhibition of what I understand used to be its most prominent feature, but it has also militated against the show of produce by increasing the difficulties of bringing it to the railways. We have to seek comfort in these matters from the good that has come, and may still come, out of evil.

In the first place, stock disease has made men look to other uses of the land besides the grazing of cattle on it, and has brought them to realise the value of the old adage that it is unwise to carry all one's eggs in one basket. I think it is to a further realisation of the truth of this saying that we owe the starting of a new Coast industry. It has occurred to some thinking people that growers of cane-sugar have suffered badly from loss of markets before now, and that it would be well to supplement that crop, which from the circumstances of its production can only have a South African market, by some other which can supply a demand from other parts of the world. We are all watching with interest Mr. Marshall Campbell's large-scale experiment of growing wattles in the Coast belt, and hoping that the prophecies of those who predict failure owing to too rapid growth, and to other causes, may be falsified. If it succeeds, and along the 250 miles of our Coast Railway wattle plantations alternate in pleasing colour-contrast with cane-fields, Mr. Campbell will deserve a place in the honourable list of those who have added to the potential wealth of their country; near the top of that list I always place the originator of the wattle industry, Sir George Sutton.

I shall not on this occasion dwell on our agricultural advance in other directions illustrated by the produce sections of this Show—on the sugar of which we expect to distribute 70,000 tons in South Africa this year, on the maize of which we are promised a nearly record crop of 750,000 muids with 350,000 muids for export, on the fruit of which we have sent more than double as much to England in the first eight shipments of this year as in the whole thirteen of last, but I shall pass to the other matter in which out of the evil conditions of the present we

may expect benefit in the future; I refer to transport. Ox transport spreads cattle disease and becomes impossible when cattle disease has spread. We do not want to revert to it when the disease has abated. We must have for bringing our produce to market light lines connected with our main railways, and good roads suitable for mechanical transport feeding our light lines. It is no doubt largely due to East Coast Fever that the pressing need for light railways has been realised by Parliament and Government, that the Mid-Illovo is to be commenced at once and to be completed in eight months from now, and that the Alfred County line is shortly to be put in hand. And, remembering a conversation I once had with Sir Thomas Price, I do not fear that when the Union Government takes over the railways of the Colonies there will be any check in construction of these communications. When that transfer occurs, roads, boats and bridges will still be left to the local government. With the experience of East Coast Fever transport difficulties behind them I should think town and country alike will press on the men they send to the Provincial Council the need of a vigorous road policy, making possible the extensive employment of mechanical traction.

A few words with regard to to-day's Show. The number of entries does not differ greatly from the number last year. There are a few more horses and sheep, and the show of these animals is good. The exhibition of goats and pigs is inconsiderable. Agricultural produce shows an improvement, and a noteworthy new class is 188, in which a special prize is given for Coast county exhibits. I have not been informed why Durban has feared to show beside Alexandra and Victoria Counties in this class; next year no doubt all four Coast counties and Zululand will enter. The number of table fruit exhibits is greater than last year; I have been told that in the past the Society has not done all it might for the systematic encouragement of the fruit industry of the Coast, and that special effort on its part is necessary if this industry is to be taken up and made the most of by progressive and keen European growers of the right sort. Natal sugar is much better represented this year than last, but there are only two entries for Natal tea. Honey and dairy products show well. The most important fresh feature of the exhibition is the new Industrial Building, in which 24 sites are fully occupied by representations of local industries. It is on local industries that the towns of South Africa depend to be kept free of the class of larrikins which has grown up in Australian cities, and this adds another to the many reasons why the public should follow the lead of this Society in doing all it can to help on the growth of such industries.

Apart from the exhibition of the Durban and Coast Society of Agriculture and Industry there is in this enclosure the separate shows of the Natal Kennel Club and the Durban and Coast Poultry Club. In both of these the numbers of entries show a large and gratifying increase on the numbers for last year.

In conclusion I wish once again to voice the public appreciation of the excellent organisation of these annual shows by the committees of the Agricultural Society, and of the Kennel and Poultry Clubs, and I should like to take this opportunity of drawing special attention to the great extent to which the Agricultural Show is indebted to the considerate and courteous attention always given to exhibitors and competitors by the Society's secretary, Mr. John Morley.

I declare the Ninth Annual Show of the Durban and Coast Society of Agriculture and Industry, and the Shows of the Natal Kennel Club and the Durban and Coast Poultry Club to be open.

Some Notes on the Exhibits.

The number of entries in the thoroughbred classes was not equal to that of last year; however, the quality of the animals shown was good. The Cleveland Bay or Yorkshire Coach was a peculiarly unfortunate section, there being practically no entry. Mr. Wm. Wood, of Woodfield, Nottingham Road, had entered his bay colt "Woodfield Prince" in the class for yearling colts of S.A. breed, and also his bay "Molly" in the class for fillies of two years, S.A. breed, but at the last moment was unable to send the animals. These being the only entries, the classes fell through. Nor was there a stallion, imported or S.A. bred, a two-year-old colt, also of S.A. breed, a mare imported or S.A. bred, or filly, yearling, S.A. bred, on show. Thus this section was one of the few failures amongst the horses. Had it not been for the fact that the Durban Corporation made something of a show, chiefly with mares, the section for cart horses would have also suffered from want of entries. The classes for stallions of three years and over, S.A. bred; colts, two years, S.A. bred; colts, yearling, S.A. bred; fillies, two years, S.A. bred; and fillies, yearling, S.A. bred, failed completely to fill.

The entries in the sheep section also fell short of last year's, but the quality was good, although, again, little or no improvement was observed as compared with the last show. An interesting feature was the exhibit by the Government of haired Persian sheep. These animals had been crossed with Merinos, and their progeny was also exhibited. This was purely an experiment, but the result did not find favour with the experts, and the opinion was expressed by the judges that further experimenting was inadvisable, owing to the fact that the progeny was very unproductive, from a wool point of view, whilst it was very difficult to give them a name. For the mutton, however, the experiment has been proved to be a success. The Persian sheep, which were brought from Cedara for the purpose of exhibition only, were of exceptionally large size. There was an excellent display of slaughter sheep, and Shropshire ewes also were very prominent. Fat hamels,

both Merinos and cross-breds, made a fine display; indeed, this may be said to have been the best section of the sheep. The most improved section was the Shropshire Downs, and the wool this year appeared to be of finer texture. This breed of sheep is meeting with great favour amongst our Midland farmers, although it was at first a moot point as to whether the pastures in that part of the country would be suited to the breed. The prizes in the Persian exhibits were secured by the animals showed by the Government. This breed is also receiving considerable attention by the farmers, and it is with them that the hope of an export mutton trade is being built. The wool of this breed is not considered to be of very good quality; however, the carcase is good. The display of wethers, clipped within two months of the show, was a good one.

Goats were very scarce, and so also were pigs. The entries in these sections showed a great falling off as compared with previous shows. However, in spite of this, it must be said that some exceptionally fine animals were on view.

The feature of the dairy produce, meat, etc., section was undoubtedly the cheese, of which there was something like three tons on show. It was magnificent cheese of the cheddar type, varying in sizes from 10 to 500 lbs. There is no gainsaying the fact that the quality of the exhibits was a long way ahead of last year, which is saying a good deal, for, according to the judges, the 1908 quality was the best on record. But then cheese-making in Natal was comparatively a young industry, and in the intervening twelve months it has gone ahead by leaps and bounds, and the quality of the South African cheese has been brought to a high standard, and it is safe to say that imported cheese is doomed so far as South Africa is concerned. Eggs were very scarce, the present time being the off-season. However, one would have expected to see a slightly larger collection of eggs on show. There were but two entries for white and three for brown, and in the latter only one exhibited.

The display of South African agricultural produce was a magnificent one. Dealing with the section in detail, one was struck with the general excellence of the entries, and, as regards the prize-winners, the judges were agreed that nothing better had ever been shown in Durban; in fact, one would almost conclude that many of the successful competitors must have devoted their time to producing samples, and, with regard to the unsuccessful competitors, it might be observed that they entered nothing which would not have found a prominent place in a show where the specialist element was less in evidence. Beans, according to the judges, were the best that have been seen on Durban shows. They were, without exception, large, clean, and healthy-looking. There was only a meagre show of peas, but with this exception the pulses were admitted to be all round first-class. In the grain section

of agricultural produce barley was poorly entered for, there being only three competitors for malting barley and a similar number for the other varieties. Ground nuts were only represented by two entries, notwithstanding the inducements held out for these productions. Hay and forage did not elicit a big show, and there was little competition. Maize, as usual, was the feature in agricultural produce. In the numerous varieties for which prizes were offered all were well entered for, and competition was even more keen than it was last year. The grain was large, clean, and well bagged. With the closest scrutiny the judges failed to discover any appearance of inferior or wasty grain. The cobs were of large size and the grain, bold, round, and well developed. Roots were, if anything, superior to those exhibited last year. Mangolds and turnips were large in size and remarkably free from any appearance of sponginess. The competition in both these roots was severe. This was likewise the case with potatoes. Sweet potatoes, however, did not evoke much competition. Pumpkins, too, were not largely represented, but those shown were aptly described as magnificent. Other classes in produce, such as wattle bark, were not represented to anything like what it would have been, considering the extent of this industry. But altogether the produce section gave evidence that Natal farmers are adopting up-to-date methods of cultivation with improved implements and a more liberal use of artificial manures. As one expert remarked, there was in every part of the produce hall ample evidence that the Natal farmers have begun to harness science to the plough.

In the competition in fruit for export most of the exhibits were attractive. Messrs. H. Howard and G. North, Northdene, and Mr. M. L. Cope, Pinetown Bridge, to all of whom were awarded first prizes, had some very daintily-packed trays or cases of fruit.

The two important factors for the brood sow are proper food and plenty of exercise.

Depth of rib, together with the well-sprung rib of a wide horse, means heart, lung and digestive capacity.

Data for Sugar Planters.

SOME USEFUL NOTES AND FIGURES.

AT a meeting of the Barbados Agricultural Society, held on Friday, May 28th last, the Imperial Commissioner of Agriculture read a paper on the subject of Central Sugar Factories. In order to make clear his arguments, Dr. Watts brought forward a good deal of useful data. The following notes, formulæ, tables, etc., having reference to the relationship that exists between the percentage of fibre in canes, and the yields of juice and sugar that may be expected under different manufacturing conditions, are reproduced by *Agricultural News* (Barbados) from the paper, as being of general interest and value to sugar planters:—

Our ideas concerning the composition of canes and the amount of juice which it is possible to obtain from them may be rendered much clearer by a very simple formula, which, although not perfectly accurate, affords approximations that are sufficiently near for our purpose. The quantity of juice contained in a cane may be calculated approximately thus:—From 100 deduct one and one-third times the percentage of fibre in the cane. On this assumption we obtain the following:—

10	per cent.	of fibre	=	86·7	per cent.	of juice
11	do	do	=	85·3	do	do
12	do	do	=	84·0	do	do
13	do	do	=	82·7	do	do
14	do	do	=	81·3	do	do
15	do	do	=	80·0	do	do
16	do	do	=	78·0	do	do
17	do	do	=	77·3	do	do

A number of experiments have demonstrated that the ordinary three-roller mill leaves in the megass from 150 to 180 parts of juice per 100 of fibre, or even more if very poor work is being done. The megass from a single mill with a cane splitter contains about 120 to 130. That coming from a train of mills consisting of a Krajewski cane crusher and two three-roller mills, in which maceration is effected, contains from 65 to 70; while the megass coming from a train of mills consisting of a Krajewski cane crusher and three three-roller mills employing maceration may be reduced to a content of 25 to 30.

If we tabulate the results which may be obtained from various systems of milling as effected on canes of different fibre contents, we obtain interesting figures:—



THE "NATAL" SPRAY PEN.—II.

Side View of the Pen.

(See "Traffics and Discoveries.")

Type of Milling Plant.	Juice per 100 of fibre in Megass.	Juice per 100 of cane when fibre content of cane is :—				
		10 per cent.	12 per cent.	14 per cent.	15 per cent.	16 per cent.
Bad single mill	200	66.7	60·0	53·3	50·0	46·7
Fair single mill	180	68·7	62·4	56·1	53·0	49·9
Good single mill	150	71·7	65·0	60·3	57·7	54·7
Cane splitter and single mill ...	130	73 7	68·4	63·1	60·5	57·9
Krajewski and two 3-roller mills with maceration ...	70	79·7	75·6	71·5	69 5	67 7
Krajewski and three 3-roller mil s with maceration ...	30	83·7	80·4	77·1	75·5	73·9
Krajewski and three 3-roller mills with maceration, best work	25	84·2	81·0	77·8	76·2	74·7
Total juice in cane ...	0	86·7	84·0	81·3	80·0	78·7

Such a table enables us to realise at once the enormous influence exerted by the fibre of the cane upon the quantity of juice which is obtainable. Thus, a good single mill will obtain from 71·7 to 54·7 per cent. of juice according as the cane contains from 10 to 16 per cent. of fibre. The table also enables us to see at a glance the influence, on the crushing, of the perfection or imperfection of the mills employed.

In order to show the influence of the fibre in the canes, and the influence of the mill on the number of tons of cane required to make a ton of sugar, the following table has been prepared, showing the tons of cane required to make one ton of sugar from canes of different fibre contents under different milling conditions, assuming juice to contain 1·95 lb. of sucrose per gallon:—

Kind of Mill.	Fibre in Canes.		
Muscovado—	14 per cent.	15 per cent.	16 per cent.
Bad single mill ...	13·7	14·6	15·6
Fair single mill ...	13·0	13 7	14·6
Good single mill ...	12·1	12·5	13·3
Factory (Crystals)—			
Do uble crushing and Krajewski	8·8	9·1	9·3

All these figures justify the general conclusion that under conditions where 13½ tons of canes are required to make a ton of muscovado sugar, a ton of crystals can be made in a modern factory from nine tons of canes. If the canes dealt with are of such a quality that more or less is required in one case, a corresponding amount more or less will be required in the other.

Toowoomba Canary Grass.

THE SO-CALLED *"PHALARIS COMMUTATA."*

THE following is the article referred to in the sub-leader in the present issue of the *Journal* on *"Phalaris commutata."* The article, which was written by Dr. Alfred J. Ewart, Government Botanist and Professor of Botany at the Melbourne University, appeared in the December, 1908, issue of the *Journal* of the Department of Agriculture of Victoria:—

This fodder grass has recently been largely advertised as the king of all winter grasses. It is stated to have been first introduced into Australia by Mr. R. Harding, Curator of the Botanic Gardens Toowoomba, Queensland, to whom credit is generally given for its introduction and distribution. Mr. Charles Ross, Manager of the State Farm, Westbrook, Queensland, however, informs me that it was introduced into Toowoomba over twenty years ago, when the late Mr. Way was Curator of the Botanic Gardens. The seed was received with about sixty other grasses from the Agricultural Department of New York, U.S.A. All the varieties were lost but this one, which existed in out-of-the-way places, such as hedgerows and rubbish-heaps. Mr. Harding drew Mr. Ross' attention to this grass four or five years ago and gave him a root. Recognising its value he (Mr. Ross) at once began to propagate and distribute it. Hence, as is often the case, the credit of introducing and spreading this grass is not solely due to one man but is to be apportioned amongst several.

"Phalaris commutata" is a native of the foothills of the Alps, and other parts of Italy. Mr. Webb, in the Sydney *Daily Telegraph,* 17th June, 1908, stated that this Italian grass was imported from America for the Toowoomba Experimental Farm in 1884, with a lot of other grasses. On account of great drought none did any good and they were thrown away on a rubbish-heap. Some years afterwards a beautiful grass was observed doing well where the roots had been thrown. This was *"Phalaris commutata."*

In the *Agricultural Gazette of New South Wales,* 1908, page 849, a number of reports from the different agricultural stations are given in regard to its utility for grazing and fodder purposes. The reports are very conflicting, but on the whole it is agreed that it grows well in winter, and up to about December, when it seeds. The stems are then rather hard, so that if it is to be used for hay it must be cut early while fresh and green. The flat, succulent leaf is readily eaten by stock, including sheep. Since the plant is not only a perennial but also seeds freely, it should maintain itself well, even under continued grazing. In any case, however, it has still to be shown that it is superior to all or any of the

fodder grasses already known and in common use. For permanent pastures it is, for instance, not certain whether it is any better than *Phalaris minor,* a well and long known species of the same genus.

For some time, the National Herbarium has been in doubt in regard to the correctness of the name given to this plant. The Kew Index makes *Phalaris commutata,* Roem. and Schult, a synonym to *Phalaris coerulescens,* and at one time it was thought possible that the plant might prove to be a cross between *Phalaris coerulescens* and *Phalaris arundinacea.* Specimens were sent to Kew Gardens, and to Professor Hackel. The Director of the Royal Botanic Gardens, Kew, writes that the plant received for identification is *Phalaris bulbosa,* L. (1755) (synonym, *Phalaris nodosa,* L. (1774). *Phalaris commutata,* Roem. and Schult, is, according to Bertoloni, a composite species described from the base of a specimen of *Phalaris bulbosa,* and an inflorescence of *Phalaris minor. Phalaris bulbosa* is a well-known native of the Mediterranean region, but I can find nowhere any account of its properties or usefulness as a fodder grass, and in general the genus *Phalaris* appears to be of more value for its seed (canary seed) than for fodder or grazing purposes. In any case it is doubtful whether the grass would be a suitable one for rotation farming, so that trials in this direction should be conducted with caution. Professor Hackel writes to say that he considers the plant to be a new, undescribed species intermediate between *Phalaris bulbosa,* L. and *Phalaris arundinacea.* L. From the latter it is distinguished by the want of subterranean scaly-leaved runners, by the wing on the keel of the sterile glumes, which is, at least, 0·4 millimetres broad (in *Phalaris arundinacea* it is wanting or minute), and by the absence of the three sterile glumes, which are present in *Phalaris arundinacea.* The same character distinguishes it from *Phalaris bulbosa,* which has also much broader wings on the keel of the sterile glume and which has three to four bulbous lowest internodes of the culm. The name of *"Phalaris commutata"* was given by Roem. and Schult to a plant gathered near Genoa (Italy), and described as having a bulbous culm and the wing of the keel of the sterile glumes *denticulate* (like that of *Phalaris coerulescens* and *minor*). It is possible that *Phalaris commutata* is a synonym of *Phalaris coerulescens,* but Bertoloni says that the specimen was combined of the vegetative parts of *Phalaris bulbosa* and the inflorescence of *Phalaris minor.* Modern Italian botanists have suppressed this doubtful name.

Professor Hackel proposes to give the name of *Phalaris stenoptera* to this grass, on account of the very narrow wing on the keel of the sterile glumes. There is, therefore, a difference of opinion between two weighty authorities as to whether this grass can be referred to an existing species (*Phalaris bulbosa*) or is an entirely new one, but both agree

in suppressing the name of *"Phalaris commutata."* If Professor Hackel is correct and we are dealing with a new species, the question arises as to its origin. Its free powers of seed production point against a hybrid origin, and we have no guarantee that the seed originally imported was pure, or in fact, that the plant with which we are dealing was actually derived from the imported seed at all. The gap of four or five years between the apparent loss of the seed and the reappearance of the plant on a rubbish-heap is a big one, and gives room for many possibilities.

The conveyance of a plant of mixed affinities from one country to another by making its seed develop under varied conditions of environment is especially likely to render it liable to sudden saltatory variations, such as de Vries found capable of producing new species in Oenothera (the evening primrose). Whether we are dealing here also with a similar case of the sudden evolution of a new species is difficult to say and can only be determined by the cultural experiments, which Professor Hackel now has in progress. If the characters on which he relies remain constant and run true to seed, it will be difficult to avoid the conclusion that we are dealing with the sudden evolution of a new species induced in a plastic stock by the action of a pronounced change of environment.

No species of *Phalaris* are native to Australia, but we have no information as to the origin and purity of the seed originally received from the United States. In all probability it came from a number of individuals which were not all precisely alike, and possibly were in some cases strongly dissimilar. The plant which succeeded in surviving in the struggle for existence on the rubbish-heap would naturally be the strongest and best suited to extreme conditions. For the present, judgment must be suspended, but the name of *"Phalaris commutata"* must be at once suppressed, and can be replaced for popular purposes by Toowoomba Grass or Toowoomba Canary Grass, or Queensland Canary Grass, while we still need more precise information as to whether this grass is really superior to those already known and widely used for fodder and winter grazing. Old lamps are sometimes more valuble than new ones, even outside of fairy tales.

Mr. Bailey, Director of the Botanic Gardens, Brisbane, writes to say that so far he has not received authentic Queensland-grown specimens of *"Phalaris commutata."* Of two specimens received one proved to be *P. arundinacea,* the other *P. nodosa* (*P. bulbosa*). From Mr. Alexander, of Brighton, and from other correspondents, we have received plants of undoubted *Phalaris canariensis* which appeared among the crop of *"Phalaris commutata."* This is all evidence tending to show that Toowoomba Canary Grass is a mixed hybrid, which tends to revert to its parent forms. We shall be indebted to cultivators of this grass if they would note and forward for examination any abnormal plants with dif-

ferent heads to the rest which may appear among the crop. It may be possible in this way to definitely and decisively determine the real nature or origin of this grass, and whether it is (1) a variety of an existing species (*Phalaris bulbosa,* L.), (2) a double hybrid (*P. canariensis arundinacea*), or (3) a new undescribed species (*P. stenoptera Hackel*).

Science and the Farmer.

NOTES BY FARMING EXPERTS.

GOOD butter should not contain more than 10 per cent. of water and 0·7 per cent. of curd, but fault cannot be found if the former does not exceed 12 per cent. and the latter 1 per cent.—*J. C. Morton* (*"The Dairy of the Farm."*)

MANURING OF BARLEY.

On soft land, farm-yard manure laid on in autumn or early winter is the best application for barley for improving or stiffening the straw. The most available form in which silicates can be presented to grain crops seems to be in the decayed straw. When early sowing is followed, farm-yard manure imparts health and strength to grain crops on all inferior and soft soils.—*R. Scott Burn* (*"Soils, Manures and Crops."*)

THE PLANTAIN.

The plantain is one of the easiest plants in the world to grow once it has become established in a suitable position. In countries where the food is the national diet of the people the lower slopes of the hillsides are the usual places planted. The plantain likes moisture and warmth—the lee side of a kopje with shelter from the east winds, moisture from the hills, rich land to grow in, and drainage for the roots appears to be the ideal site. It should be high enough to escape the severe frosts that occur in the valleys.—*C. E. F. Allen* (*"Rhodesian Agr. Journal," June, 1909.*)

CALVING-TIME.

When a cow shows signs of calving, it is advisable to move her into a warm, dry and airy loose box. Assistance should be rendered at the right time—that is when the calf's feet appear—but the process should not be hurried. It is well to give nature a chance, and help it. A couple of quarts of cold water refresh a cow after the labour of parturation, and they should shortly be followed by warm oatmeal gruel. These, however, are not immediately needed, if the cow is allowed to lick the calf—a function, however, which unsettles the cow, if the calf is afterwards taken away, though good for the calf.—*Prof. J. P. Sheldon* (*"The Farm and the Dairy."*)

GREEN CROPS.

The most usual plan for bringing land into condition for the growth of cereals is the cultivation of green crops. These may be ploughed in, forming what is termed green manuring; or consumed on the land by the farm stock; or the crop may be removed, consumed in cattle-sheds or in the farm-yard, and the resulting manure brought on to the land. The principle in every case is that the constituents of the crop shall be returned to the soil. The consumption of the crop off the land, and the bringing back of farm-yard manure, is the most imperfect of these modes of restoration, owing to the losses which occur during the making of farm-yard manure.—*R. Warrington, M.A., F.R.S.* (*"The Chemistry of the Farm."*)

DUTY AND MEASUREMENT OF WATER.

In the shortage of water in order to determine the amount which can actually be conserved for useful purposes, it is necessary to ascertain the extent and the rate of evaporation under different conditions of latitude, altitude and general climate. Local conditions, character of the soil, slope of the land, cultivation, humidity, evaporisation, precipitation, drainage and capillary action are so widely at variance in different localities, that there is small hope of getting any formula which will admit of extended application. Crops differ with respect to moisture requirements. For example, oats and wheat will require more than rye and barley, and buckwheat, amber cane and corn still less than the other grains.—*Lue Wilcox* (*"Irrigation Farming."*)

BREEDING AND PEDIGREE RECORDS.

The primary and most fundamental requirement in all breeding work, whether conducted for scientific or utilitarian purposes, is that at any stage of the work there shall be an exact knowledge of the ancestry (to as remote a degree as possible) of each of the individuals composing the breeding stock. A successful outcome of such work depends upon, among other things, an adequate system of keeping pedigree records. Not only must the pedigree records be accurate and systematic on paper, but they must also be *trustworthy*. To ensure that they shall be trustworthy it is necessary that the concrete breeding operations be carried on in such systematic fashion that errors in or contamination of the pedigrees either will not occur, or if they do occur will be at once detected. That is to say, breeding operations must be so systematised that, for example, there cannot arise in the breeder's mind any doubt that the actual parents of a given individual are the animals which he supposes to be the parents.—*Raymond Pearl and Frank M. Surface* (*Maine Agr. Expt. Station.*)

Farm and Garden Notes for August.

By Geo. Carter, F.R.H.S.

CHILIAN CLOVER.

There is a good deal of talk in the Mooi River district about a new clover, called "Chilian," which seems to be doing remarkably well there. I saw this early in May in a piece of ground cultivated by Mr. Abbott, who was good enough to give me all information he had. He had obtained the seed under the above name in the Eastern counties of England. There can be no doubt that this little crop was worth looking at, being of very vigorous growth, and clean, nice stuff. Although the leaf seemed a very familiar one at the time I saw it, its very success in a district where most clovers cannot be said to do very well seemed to make it worth while making further enquiries. Had the plant been in flower one might have named it at once, but there was not a flower to be seen. I therefore wrote at once to several prominent English seed firms, asking them what it was that the Eastern counties farmers were growing under the name of Chilian Clover. The replies are now here, and they all agree that it is our old friend Red Clover (*Trifolium pratense*) under a new name. A great deal of Red Clover is now imported into England from Chili, hence the new name. So much for identification. The extra beauty and vigour of the plant can be accounted for by the extra tilth and manuring given by Mr. Abott to the ground where it is growing, and perhaps the plentiful rains of the autumn have a good deal to do with it. It may be very seriously doubted whether it would be possible to give a large farm area the same generous treatment as this ground has had. One cannot draw universal conclusions from such a small piece of ground. There may be something, however, in the country of origin of the seed, for it is quite conceivable that seed from Chili would more readily acclimatise here than seed grown in Europe.

ARTICHOKES AS A FARM CROP.

Farmers who intend to put in an acre or two of Jerusalem Artichokes this spring should do the work in August. This is one of those excellent weedy things which, while being very easy to grow, and suffering from no diseases, are most useful during the winter months, especially where pigs are raised. Twenty pigs can be kept going all winter on an acre of Artichokes. We have a small crop just now which, grown without any manure, is yielding at the rate of 300 sacks per acre. The culture of the Artichoke is almost the same as for potatoes. "Seed" should be put into drills three inches deep, three feet apart, and the distance in the rows two feet. We find the crop gets through much better on heavy land

at three inches deep than at even four inches, but if the land be light an inch more or less will be of very little importance. The crop grows right through the season until March, and may be dug at any time after the leaves turn brown. Tubers will not store, in Natal, out of the ground, and should never be out of the ground longer than a fortnight. The best way of reaping, if the pigs are not to do the work, is to dig just as they are required. For the second crop the same ground may be used again, but it is advisable to plough all up and replant. There are several varieties, but not one can at all equal Sutton's New White. Those who are now growing the old red skinned variety should at once change over to this, for in all points, size, shape, yield and flavour, it is by far the best.

EARLY POTATOES.

August is a favourite month for getting these in. It is unfortunate that a very early variety can scarcely be obtained, and planters must needs fall back on the second early, say, Flourball or Windsor Castle. Both these are excellent varieties, but will take fully 3½ months to mature.

The transplanting of onions sown in April should now commence.

THE VEGETABLE GARDEN.

In the colder districts gardening is still confined to a few varieties of vegetables. A good sowing of early peas should go in this month. "Yorkshire Hero" is still the safest of the marrowfat type. Early potatoes (as early a variety as can be obtained) should be planted for November use, for potatoes will be scarce then. The "seed" will not be through the ground for a fortnight, and by that time nearly all danger from frosts will be over. Summer lettuces and cabbages should be sown now, and onions transplanted. Those who omitted to sow onion seed in the autumn should sow at once, choosing a spring variety, such as "Queen," "Ailsa Craig," or "Danver's Yellow" The Neapolitan type will not do well if sown in the spring in some districts. Finish off the rhubarb planting, and get in a good sowing of leeks. Too many people sow leeks in the autumn, with the result that immediately warm weather comes in spring all the plants bolt to seed.

In the Midlands districts August is a great gardening month, for frost is over, and almost anything in the calendar may now be sown. This is the last possible month for artichokes, asparagus, shallots and rhubarb. We commence with dwarf French and runner beans. Dwarf beans should be grown systematically for home supply, so that there may be a good pulling all through the season. My plan is to sow two rows during the first week in every month throughout the season, that is from August right up to the end of February. One can seldom keep the bushes in good bearing for longer than a month, although the running varieties and some kind of "Lima" may be kept going nearly all summer by judicious picking. Take for dwarf varieties "Canadian Wonder" and



THE "NATAL" SPRAY PEN.—III.

Interior of the Pen: taken at instant of closing roof sprays and opening floor sprays.

(See "Traffics and Discoveries.")

"Golden Butter," two distinct types; for runners the old "Scarlet Runner" and "Advance," and put in for a trial a line each of "Soy" and "Lima."

Vegetable marrows are never quite so nice as when sown in August, and the same may be said of cucumbers. The later in the season these are sown the more likely they are to be attacked by mildew, and ruined. For an early cucumber we still like the "Early White Spine" best, and follow on with "English Prickly" or "Green Giant." There is one dainty little cucumber, called "Chamber" cucumber, which is exceedingly early, and which runs so little that it is easily grown in a box, even in a room of the house near the window. Rhubarb seed should now be sown. In a previous article I grumbled about the great tendency of the "Crimson Winter" variety to run to seed in the summer, but since then the true value of this variety has come out. We had some excellent stewed rhubarb on the table to-day (July 20th), of first-class flavour, although we have had many frosty nights recently and every variety but Crimson Winter has long ago receded into the ground. I feel quite confident that this new kind may be relied upon to be an excellent kind for at least the colder Midlands, and there is certainly no other which will yield good stalks in July without forcing. I noticed also that, whereas we always lose a great number of the older varieties by rotting off in the autumn, not a single plant of "Crimson Winter" has died out. The block we are pulling from now was sown last August, so that if you want rhubarb next winter sow the seed of this variety now.

Apart from the items mentioned above, nearly everything may be sown now. But a good general principle in gradening is to avoid growing anything in the spring which will do well in autumn and winter. Let each season have its special selection.

FLOWERS.

On the high veld the sowing of flower seeds is still limited by cold weather, but a good sowing of sweet peas and pansies should go in, and a few of the more tender annuals should be sown in boxes in some warm corner. In the Midlands the possible list of flowers is immense, and cannot be enumerated here. Sow anything, but again, do not sow those flowers which do well in autumn and winter. Spring, summer, autumn and winter flowers should be distinct types, arranged so that as many varieties as possible may be grown in your (perhaps) limited space during the year.

Cyclamen, primula and primrose should be sown now in boxes, so as to have the plants a good size for blooming next winter.

Where there is plenty of room a good effect in colour may be had by what we call "massing," that is, growing one kind of flower, or one colour of flower, in a bed by itself. For this purpose use such things as

Salvia splendens, Begonia gracilis, Asters, Carnations, Columbines, etc. A mixed border is both beautiful and useful, but in a large garden a full effect is never produced without at least a few masses of solid colour. It is important to get really good strains of seed for this work.

Towards the end of the month it will be time to begin dividing up the Dahlias and Cannas, as they show signs of growth. We no longer do this work all at once, as is the case of countries where the seasons are shorter. Dahlias soon wear themselves out, and are generally past their best by the end of February. It is quite easy to keep up a succession of good blooms right up to frost by planting gradually until Xmas. The bulbs will take no harm in the meantime if they are stored in a cool place on soil. Bedding Pelargoniums (ivy leaved) should be put out at the end of the month, and some newer kinds of perennial phloxes for midsummer blooming. Natal gardeners have been growing the same old varieties of Phloxes for the last twenty years, and in that time a wonderful advance has been made in this flower. Chrysanthemum cuttings may be taken at any time, and will soon root in tins or soil made up of a third each leaf mould, garden mould, and sand. If any readers would like a little more guidance in Chrysanthemum culture I will willingly send a reprint of Mr. D. C. Powell's recent lecture on this glorious flower to as many as desire one. But don't worry the Editor; send direct to me. (Box 292.)

Exchange Reviews.

WHAT OTHERS ARE THINKING AND DOING.

THE *Mark Lane Express Agricultural Journal,* in its issue of June 7th, 1909, contains a very useful article on the manuring of swedes and turnips. There is no necessity for dressing the land with large quantities of farm-yard manure. The desired object can be obtained quite well by a moderate dressing of 10 tons. The best and most economical results are produced by a small quantity of dung supplemented by artificials. The Midland Agricultural and Dairy College state, as the result of their experiments, "a small dressing of dung and artificials gives a larger crop than when dung is used alone, either in small or large quantities." Of the artificials the most important for the crop is undoubtedly phosphate of lime, and in general use farmers should give the preference to superphosphate, although on very strong soils or on land where "finger-and-toe" is prevalent basic slag can be used with advantage.

For light soils a turnip manure should contain some potash; thus the Board of Agriculture recommend the application of kainit up to 2 cwt. per acre if the land is very light. The Irish Department of Agriculture suggest the following mixture with 10 tons of dung:—1 cwt. sulphate of ammonia; 4 cwt. superphosphate, 35 per cent.; 3 cwt. kainit, which is equivalent to a dressing of 8 cwt. special manure containing about 3 per cent. of ammonia; 17 per cent. soluble phosphate; 5 per cent. potash. This is a very liberal dressing, the benefit of which would be largely seen in the following crop.

Diseases of the Udder in Cows.

The *Live Stock Journal,* in its issue of May 7th, 1909, contains a useful article pointing out the diseases which may be mistaken for tuberculosis. Perhaps one of the most common diseases to be mistaken for tuberculosis of that gland is ordinary mammiuits, mastitis, or "gorget," as it is commonly termed in some localities, because, after the acute inflammatory condition has abated, there always remains more or less thickening and hardness of the affected part, and it is by no means the easy matter some people would have us believe to differentiate between thickening or a firm "lump" caused by ordinary inflammation and that produced by the action of tubercle infection; especially is this difficulty present when the thickening caused by ordinary inflammation is localised, as is generallly the case when it is the result of an injury from without, such as a poke from another cow, etc. It sometimes happens, too, that ordinary inflammation is set up in an udder that is already infected with tuberculosis, so that the one condition is masked by the other, or confounded with it.

Sore teats, caused by eczematous eruptions, chaps, or cow-pox, which make the cow troublesome to milk, are often the forerunner of some udder trouble, which it not unlikely to be mistaken for tuberculous lesions by an unpractical man. The only sure method known at the present time to detect and differentiate tuberculosis lesion in the udder is by microscopic examination of the tissue itself. Even the tuberculin test cannot be relied upon in cases of udder disease to definitely diagnose the case, as it seems to be undoubted that a reaction does not necessarily occur after injection of tuberculin when there is localised tuberculous disease of the udder.

Manuring for Milk.

A recent issue of *The Dairy* contains the results of recent experiments which were carried on with the purpose of trying the results of manuring for milk. Two pieces of pasture were set aside. On one

nothing was applied, while to the other 3 cwt. of basic slag and 1 cwt. of potash salts per acre were applied. Two lots of cows as alike as could possibly be found were grazed on the plots, and their milk weighed and sampled carefully in the usual way: the result showed that the manured plot yielded 5 per cent. more than the other. The cows were then transposed on the plots, and the yield again tested, and this time the result was about 2 per cent in favour of the manuring.

The quality of the milk was tested at the same time, and it was found at the first experiment that the milk off the slag was richer than the other by 55 per cent. of butter fat: with the transposed animals it was still 21 per cent. better. The most interesting point is the effect on the richness of the milk: no one has yet been able to find that food could be made to permanently improve the quality of the milk, no matter how rich the food is, but the influence of soil seems to be something different. The lesson for the dairy farmer is to slag his pastures, and if these are on light soil to add potash salts.

Manganese and Pineapples.

The Hawaii Agricultural Experiment Station has recently issued a bulletin giving the results of experiments which were carried on for the purpose of determining the influence of manganese on the growth of pineapples. Some of the pineapple soils of Hawaii contain black spots on which pineapples do not grow successfully. The application of fertilisers and lime, in conjunction with good tillage and drainage, has not resulted in effectually overcoming the yellow appearance of the pines on black soils. These black soils contain less acidity than the red soils. There is but one important difference in the chemical composition of these soils, *viz.*, in regard to the manganese content. The black soils contain many times as much manganese as the red soil. The black colour of these areas may in part be attributed to the presence of higher oxides of manganese. There is a close connection between the degree of yellowing of the pines and the percentage of manganese in the soil. Yellow pines from soils containing a high percentage of maganese are more active oxidising agents than green plants from red soil. The yellow pines have a poor root system and contain but little chlorophyl. As yet no positive remerdy for this condition has been worked out. It seems wise to try other crops on the black soil, especially since sugar-cane grows well on the black soil.

Artificial Manures and the Cotton Crop.

A useful article is contained in the March number of the *Tropical Life* on the application of artificial fertilisers to the cotton crop. However, it should be clearly understood that no absolutely hard and fast

rules can be laid down. Soils differ and climates vary, and the planter must adapt general suggestions to his own particular conditions, of which he necessarily has special knowledge.

Assuming the soil has been thoroughly prepared, the question then arises as to whether the soil contains nitrogen, phosphates, and potash in sufficient quantity; if not, they must be supplied, and in as soluble a form as possible, so that they may be available as food to the plants from the outset of their growth. The majority of the results of experiments suggest the advisability, in most cases, of supplying all these constituents, unless, of course, one or other is already present in abundance. One thing must be kept in mind, that phosphoric acid should be present or supplied in abundance, if only on account of its powers in assisting the plants to assimilate the other constituents.

The cotton plant responds promptly, liberally, and profitably to judicious fertilisation, and though cotton may be, and is, *continuously* grown with profit and without impoverishing the soil, when it is adequately fertilised with chemical manures, yet it would seem that a three years' rotation—small grain, maize, and cotton—is, perhaps, the better method. The article mentions that experience has shown that for an average soil in fairly good condition a judicious use of the three constituents will produce the best results, if applied in some such proportion as this, per acre:—Superphosphate of lime (containing at least 14 to 16 per cent. phosphoric acid), 500 lb.; nitrate of soda (in two or more applications), 200 lb.; kainit, 200 lb.

Conservation of Soil Moisture.

In an article on the conservation of soil moisture, published by *St. George's Agricultural College, Ontario,* it is pointed out that spring seeding is closely connected with this great problem of conserving soil moistures. Early seeding enables crops to use the water otherwise lost by evaporisation. It may also save plant food from leaching in the drainage waters by having made use of this water in the plant economy. There is danger in too great haste in seeding, however. One might better be a little too late than too early. If too early, the plants come weak and sickly or the seed rots in the soil. The effectiveness of tillage in conserving soil moisture is greater in the spring than at almost any other time. In the spring there is invariably a wet surface exposed, and this wet surface carries water off much more rapidly than can dry soil. The farmer should aim to keep simply a dry, loose blanket of soil, which will make the effective mulch.

All mulches need not be made from soil. Some of the best and the most effective are made from manure. By applying barnyard manure as a top-dressing one obtained a physical as well as a chemical benefit from it. The seasons' rains wash the fertilising constituents into the soil, where they will be available to the plants. The refuse remaining on top makes an effective mulch for retarding evaporation. This double action of manure, when applied as top-dressing, is a strong argument for pursuing this practice and for making use of the manure-spreader, in order that the manure may be more advantageously applied.

Under-drainage is also a large factor in conserving soil moisture. It is a matter of common experience that crops on well-drained soils will withstand drought better than those on similar soils not so well drained, although the crops at the commencement of the drought were equally good. The explanation of this phenomenon is, that drainage always improves the texture of the soil. With this improved texture comes increased capacity for retaining water.

Milk Sickness.

"Milk sickness" is a rather peculiar disease which prevails in the central parts of the United States, where, at times, it occurs as an epidemic among both cattle and people. This has recently been the subject of a report by Dr. J. R. Mohler, the Chief of the Pathological Division of the Washington Bureau of Animal Industry. In this we are told that in cattle the first indication of the disease is dulness, followed by violent trembling and great weakness, which increases during the succeeding day until the animal becomes paralysed and dies. Through the ingestion of flesh, milk, or dairy products of an affected animal, the disease is transmitted to man or to another animal, and attacks produced in this way often prove fatal. In man the disease develops with marked weariness, vomiting, retching, and insatiable thirst. Respiration becomes labour, peristalsis ceases, the temperature is sub-normal, and the patient becomes apathetic. Paralysis gradually follows, and death takes place quietly without rigor mortis. Many efforts, it appears, have been made to discover the nature and cause of the disease, and many theories have been put forward. None, so far, have been generally accepted. Some investigators have held that the disease is of a micro-organismal origin; some, that it is due to auto-intoxication; while others believe that it is caused by vegetable or mineral poisons. All seem to agree, however, that the disease is limited to low, swampy, uncultivated land, and that the area of the places where it occurs is often restricted to a few acres. It also appears that when such land or pastures have been cultivated and drained, the disease disappears completely.—*Live Stock Journal,* May 14th, 1909.

White Scour.

The Farmers' Gazette, in its issue of June 12th, 1909, contains a useful article dealing with the disease of "white scour." One naturally wants a prescription for some medicine whenever anything goes wrong with the live stock, but in this case medicine is of no use once the disease has got a hold, and all efforts must be made to get clear of it by preventive disinfection and sanitation.

The calving pens or byres where the calving cows are must be thoroughly disinfected: the genital parts of a cow about to calve must be disinfected, a solution of Lysol being the best for the purpose; and above all the navel string of the newly-born calf must be tied and disinfected as soon as the calf is born, and the bleeding string must not come into contact with the floor or with the litter till it is sufficiently healed up to prevent the ingress of the fatal germs. The whole treatment is for the purpose of preventing the germs coming into contact with a bleeding wound on the calf, and therefore cleanliness and disinfection must be thoroughly carried out.

The sore shoulder in horses is usually caused by the dirty collar.

Good rich cream with a large percentage of butter-fat will keep sweet the longest.

Desirable qualities in a horse are fixed by a long line of careful selections and breeding.

It's just as poor policy to work a horse too soon after feeding as to feed too soon after working.

Among the Farmers.

THE ASSOCIATIONS DURING THE MONTH.

THE tenth annual show of the Newcastle Agricultural Society was held at Newcastle on the 24th and 25th June. The feature of the Show was the combination with the Northern Districts Poultry Club, who held their exhibition within the Showground. The President of the Society, F. A. R. Johnstone, Esq., M.L.A., in declaring the Show open, trusted that the public would excuse any deficiency there might be in the exhibits, because, on account of the stoppage of ox transport, many exhibitors were unable to send produce, etc., for the Show. The Show on both days was well attended, and, although the agricultural section was rather disappointing, the poultry was excellent.

WEENEN AGRICULTURAL SOCIETY.

ANNUAL SHOW.

The Weenen Agricultural Society were most fortunate as regards the weather for their 46th annual show, which was held at Estcourt on the 24th June. This, together with a fair collection of stock and agricultural requisites, proved to be very attractive, and there was an excellent attendance of visitors; in fact, in this respect, the Society have every reason to be congratulated. The number of entries, however, was below that of last year, owing, entirely, to the East Coast Fever restrictions, and the difficulties of transport rendered thereby. However, it must be mentioned that practically every entry was well worthy of being exhibited. The total number of entries was 472; the entries of the various sections being:—Horses, 70; sheep, 58; goats, 3; pigs, 16; poultry, 48; dogs, 23; produce, 129; roots, hay, etc., 58; manufactures, 43; agricultural implements, 2; extra exhibits, 11.

The judges were:—*Horses*: W. Henwood, J.P., P. Otto, J.P., W. Buchanan. *Sheep*: R. Abbot. *Goats*: Jno. Jewitt. *Poultry*: R. Abbot. *Dogs*: E. P. B. Arnold. *Produce, etc.*: J. C. Cope, G. Ross, F. Reed, Allan Stuart. A brief review of the various sections is appended.

Horses.—The show of horses was a good one as regards general quality; however, one would like to see more entries in the different classes. Imported stallions were the first to come into the ring, which was headed, after a somewhat lengthy scrutiny on the part of the judge, by Mr. Stoffell Marais' "Sherrington" with a deal of substance, and so also was the second prize winner, "Bay Lawn," the property of Mr. P. D. Simmons. There was also a struggle in the second class: Colonial

stallion, 3 years and over, in which Mr. G. E. Blake's "Vassal" proved successful. All the winners of the remaining classes of this section were fine animals, and their owners have reason to be proud of them.

Sheep.—After the horses came (in the catalogue) the sheep, which section was provided with classes for Merino and Downs. Some first-class animals were forward; but competition was scanty, the entries being disappointingly few; with the result that the major portion of the awards fell to one or two exhibitors in each of the various classes. For instance, the Hon. H. D. Winter, M.L.A., won eight prizes out of nine for Merino, and, out of a total of eleven for Downs, Mr. R. Garland secured six, while the remainder fell to Mr. G. Hutchinson. It was a pity there was not a stronger entry in this section, considering the marked importance of this particular class of stock in the Weenen district.

Goats.—This section was exceptionally poor, there being only two sections, and, worse still, a meagre total of three entries.

Pigs.—In this section also the prizes fell into very few hands; however, the quality was good and the animals well deserved their awards.

Poultry.—This section was perhaps the feature of the show. Some very fine birds were exhibited, and all the prize-winners were most deserving. Mr. T. Hindle was very prominent, securing 12 out of a total of 22 prizes. The remainder of the awards were exceedingly well distributed, no other exhibitor securing more than two.

Miscellaneous.—It is most encouraging to learn what great strides have been made in agriculture in the Weenen district, as was proved by some of the exhibits which were to be seen on the show. It must be said that mealies and Kafir corn were in all probability the most perfect which have ever been seen in the Weenen district. Some first-class oats and millet were also shown. The butter and eggs were a vast improvement on what were exhibited on the previous shows, and so also were most of the remaining articles of the *Produce, Roots, Hay, etc.,* and *Manufactures* sections.

CAMPERDOWN SHOW.

The fifth Annual Show of the Camperdown Agricultural Society, which was held at Camperdown on 23rd June, must be voted a thorough success. The attendance of the Camperdown people and visitors from the neighbouring centres was quite a record. Since the formation of the Society, Camperdown has always been well to the front with its agricultural shows, and it was agreed on all sides that this year's show surpassed all previous events. The entries totalled over 800, there being an increase of about 150 over that of last year.

The Show was opened at noon by Mr. E. W. Evans, of Durban, who,

in the course of his speech, congratulated the Camperdown people on this year's splendid exhibits. He remarked upon the all-round excellence of the produce sections. The Show he regarded as the best country show he had seen in Natal, and he was speaking with 25 years' experience. The Agricultural Society of Camperdown had justified its establishment. Mr. Evans emphasised the necessity for growing greater quantities of mealies now that the quality was well up to the standard of excellence. They had to inaugurate a prize system of mealie seed growing as was done in other parts of the world, in order to grow only from the very finest specimens. He urged upon farmers to compete for the prizes which the Government were offering for tree-planting, which was one of the most important things in the Colony. He referred to East Coast Fever, and said that it was hoped that under Union an effort would be made to stamp out the disease entirely.

Camperdown boasts, and justly so, of its splendid mealie production, and the exhibits in this direction were not only varied, but of superlative quality. In fact, the judges in this section experienced a deal of difficulty in arriving at their decisions. The show of horses was a good one; so also was that of dogs. It was in the produce sections that the Show was able to lay claim to the boast of being second to none in the districts. The potatoes shown were of good quality, all the bags decorated with prize tickets proving the worth of the Safco fertilizer. The show of beans was a splendid one. The pastry, cakes, home-made bread, jams, preserved fruits, jellies and chutneys were adjudged by experienced men to make the best exhibition of the kind seen anywhere in Natal. Some of these exhibits were even superior to those which were seen at the City or Durban show.

Messrs. North & Sons had a fine display of farming and agricultural implements on show, some of which attracted the very close attention of farmers, viz., "The Columbian Plough," which plough has carried off thirteen first prizes; the "New Deere" mealie planter, which is now fitted with special Hickory King seed attachment, with the edge-drop pattern plates in place of the round hole: "The Canadian Wonder," the "Het Volk," and the special "Rex cream separator.

JUDGES.

Horses: F. G. Burchell and H. J. Stirton. *Sheep and Goats*: J. W. T. Marwick. *Pigs*: J. W. T. Marwick. *Poultry*: H. Jones-Ikin. *Cereals*: C. E. H. Thrash. *Produce*: Geo. Carter, C. E. Thrash, J.P., and H. Baker. *Implements*: H. Baker. *Dogs*: A. J. Peters. *Manufactures*: A. N. Kirkman, J.P. *Preserves, etc.*: S. E. Holman. *Butter and Lard*: A. Lawrence.

Coal and Labour Return.

Return of Coal raised and Labour employed at the Natal Collieries for the month of June, 1909:—

COLLIERY	Average Labour Employed.					Output.	
	Productive Work.			Unproductive Work.*	Total.		
	Above Ground	Below Ground.	Total.			Tons.	Cwt.
Natal Navigation ..	363	575	938	20	958	20,480	1
Elandslaagte .. .	256	523	779	16	795	13,300	9
South African	112	294	406	65	471	11,333	0
Glencoe (Natal) ..	167	376	543	41	584	11,231	19
Dundee Coal Co. ..	296	463	759	—	759	11, 65	7
Natal Cambria ..	207	356	563	5	568	10,727	11
Talana.. ..	141	407	548	9	557	8 870	0
St. George's ..	175	340	515	5	520	7,921	0
Dur an Navigation ..	192	390	582	—	582	7,844	0
Newcastle	85	396	481	—	481	6,660	14
Hlobane	98	240	338	32	370	5,212	15
Natal Steam Coal Co. .	78	187	265	15	280	4,546	4
Ramsay	89	151	240	11	251	3,613	7
West Lennoxton ..	56	80	136	—	136	1,617	2
Ballengeich	47	62	109	36	145	1,217	8
Hatting Spruit ..	66	91	157	—	157	1,120	8
Central .. .	25	41	66	—	66	973	14
Vryheid ‡	3	5	8	—	8	12	0
Dundee Coal Co ,B'rnside	—	—	—	199	199	8	0
Nooitgelacht	2	3	5	—	5	6	0
Vaalbank ‡	—	3	3	3	6	4	6
Makatees Kop ‡ ..	3	—	3	—	3	3	10
Totals	2,461	4,983	7,444	457	7,901	127,798	9
Corresponding month, '08	2,284	6,013	8,297	972	9,269	126,717	14

	Productive Work.			Unproductive Work.	Total, June, 1909.	Total, June, 1908.
	Above Ground.	Below Ground.	Total.			
Europeans	195	145	340	62	402	466
Natives	807	3,253	4,060	274	4,334	5,470
Indians	1,459	1,585	3,044	121	3,165	3,333

* Cost Charged to Capital Account. ‡ May Returns.

CHAS. J. GRAY,
Commissioner of Mines.

Mines Department, Maritzburg, 9th July, 1909.

RETURN OF COAL BUNKERED AND EXPORTED.

Return of Coal bunkered and exported from the Port of Durban for the month of June, 1909:—

	Tons.	Cwt.
Bunker Coal	51,607	3
Coal Exported	24,423	8
Total ..	76,030	1

Customs House, Port Natal,
1st July, 1909.

GEO. MAYSTON,
Collector of Customs.

Meteorological Returns.

Meteorological Observations taken at Govt. Stations for Month of June, 1909.

STATIONS.	TEMPERATURE (IN FAHR. DEGS.).				RAINFALL (IN INCHES).					
	Means for Month.		Maximum for Month.	Minimum for Month.	Total for Month.	No. of Days.	Heav'st rainfall in 1 day.		Total for Year from July 1st, 1908.	Total for same per'd from July 1st, 1907.
	Maximum	Minimum					Fall.	Day.		
Observatory ..	74·7	55·8	80·8	51·5	2·56	4	2·56	5th	41·95	45·57
Stanger ..	75·8	54·1	84	50	·41	2	·41	0th	41·01	46·89
Verulam ..	78·2	50·	87	47	·34	1	·34	24th	37·64	42·33
Greytown ..	69·1	39·	76	31	Nil	—	—	—	44·83	41·33
Newcastle ..	72·5	32·7	78	26	Nil	—	—	—	—	41·68
Imbizana ..	76·8	52·8	88	48	·06	2	·04	25th	39·97	49·04
Estcourt ..	69·8	32·2	76	27	Nil	—	—	—	31·99	29·14
Bulwer ..	—	—	—	—	·01	2	·01	28 h	53·59	48·41
Ixopo	—	—	—	—	Nil	—	—	—	35·15	—
Umbogintwini ..	75·4	49·4	82	44	1·19	3	1·09	25th	—	—
Port Shepstone	80·5	53·1	87	50	·04	1	·04	18th	40·69	46·90
Umzinto ..	—	45·3	—	42	·76	2	·73	24th	46·31	49·42
Richmond ..	72·4	43·9	78	37	·02	1	·02	14th	55·54	42·49
Maritzburg ..	75·8	41·4	85	37	Nil	—	—	—	37·69	36·16
Howick ..	70·3	37·3	78	32	Nil	—	—	—	40·59	38·80
Ladysmith ..	75·6	37·2	82	33	Nil	—	—	—	—	—
Dundee ..	68·5	41·5	76	39	Nil	—	—	—	39·63	31·27
Weenen Gaol ..	77·2	32·7	80	29	Nil	—	—	—	44·83	29·32
Mid-Illovo ..	72·8	50·0	85	44	Nil	—	—	—	44·12	42·69
Krantzkloof ..	74·8	54·4	84	48	·06	1	·06	25th	42·85	—
New Hanover ..	74·6	40·4	78	30	Nil	—	—	—	43·06	42·83
Camperdown ..	79·4	48·2	86	44	Nil	—	—	—	29·45	29·41
Krantzkop ..	67·0	43·9	3	37	Nil	—	—	—	35·68	—
Nongoma ..	68·7	46·2	76	42	·10	3	·04	11&12	—	—
Charlestown ..	64·2	30·9	69	24	Nil	—	—	—	45·41	31·31
Vryheid ..	71·5	41·8	80	39	Nil	—	—	—	—	38·48
Nqutu ..	65·2	43·0	70	38	Nil	—	—	—	37·43	—
Hlabisa ..	77·2	56·2	82	52	·30	1	·30	29th	47·58	34·22
Melmoth ..	71·4	50·1	79	46	·15	2	·11	11th	31·12	28·20
Ubombo ..	63·6	54·1	5	51	·18	1	·18	12th	42·37	35·49
Point ..	—	—	—	—	·42	5	·36	4th	44·91	55·60
Lidgetton ..	74·2	33·4	88	28	Nil	—	—	—	43·38	—
Nottingham Rd	66·0	26·3	72	19	Nil	—	—	—	—	—
Mahlabatini ..	79·1	42·1	82	36	Nil	—	—	—	32·64	28·94
Empangeni ..	76·0	51·5	81	42	·93	2	·47	29th	45·63	46·16
Mtunzini ..	76·0	54·7		50	·54	2	·30	28th	72·74	54·94

Meteorological Observations taken at Private Stations for Month of June, 1909.

STATIONS.	TEMPERATURE (IN FAHR. DEGS.)		RAINFALL (IN INCHES).					
	Maximum for Month.	Minimum for Month.	Total for Month.	No. of Days.	Heaviest rainfall in 1 day.		Total for Year from 1st July, 1908.	Total for same period from July 1st, 1907
					Fall.	Day.		
Adamshurst	79	37	0·00	0	0·00	—	—	—
Hilton	78	41	0·02	1	0·02	14th	43.32	37·29
P.M.B., Botanical Gardens ..	—	—	—	—	—	—	—	—
Ottawa	—	—	0·65	1	0·65	25th	38·09	42·47
Equeefa	84	52	0·70	2	0·38	25th	43·06	47·84
Umzinto, Beneva	—	—	0·28	2	0·27	23rd	41·83	52·61
Umhlangeni	—	—	0·03	1	0·03	23rd	41·53	—
Reit Vlei	—	—	—	—	—	—	—	—
Branxholme	—	—	00	0	·00	—	64·19	66.06
Cedara—Hill Station	75	38	·00	0	·00	—	—	—
,, Vlei Station	76	25	·00	0	·00	—	—	—
Winkel Spruit	80	49·5	3·71	3	3·68	24th	46·76	48·19
Weenen	73	24	·00	0	·00	—	—	—
Giant's Castle	65·3	6·6	·00	0	·00	—	49·23	49·58

Return of Farms at Present under Licence for Lungsickness and Scab.

STOCK INSPECTOR.	DISTRICT.	DISEASE.	OWNER.	FARM.
A. P. Craw ..	Ladysmith ..	Scab	J. A. Good ..	Matiwana Hoek
		,,	J. de Waal ..	Lombard
		,,	W. Wright ..	Maggiesd
		,,	W. M. G. Bowers ..	Zieberg
		,,	E. Moreland ..	Reit Kuil
		,,	Mrs. M. J. v d Merwe	Coolfontein
		,,	Natives ..	Roosboom
		,,	Natives ..	Faurie's Kraal
		,,	H. Raath ..	Putteni Spruit
		,,	T. J. M. Buys ..	Reuit Kuil
A. B. Koe ..	Portion of Estcourt	,,	C. Blacker ..	Rietfontein
		,,	J. R. van der Merwe	Welgekezen
A. C. Williams ..	Utrecht ..	,,	Jan ..	Kromelenboog
		,,	Umlumbo ..	Twyf lontein
		,,	Umtellen ..	Do.
		,,	Unisjloeta ..	Klipspruit
		,,	W. Kruger ..	Goed Geloof
		,,	Natives ..	Veeltkop
		,,	Natives ..	Klipfontein
		,,	Natives ..	Quaggasdrift
		,,	Natives ..	Groot Vlei
		,,	Mrs. R. P. Spies ..	Goede Hoop
		,,	Natives ..	Onverwacht
		,,	Natives ..	Groot Vlei
		,,	Natives ..	Sandspruit
H. Van Rooyen ..	Balanango ..	,,	G. Haines ..	De Waal
		,,	Sloekwana ..	Haitstogd
		,,	Natives ..	Hartstogd
		,,	C. van Rooyen and Natives ..	Vriendschap
		,,	Natives ..	Evergreen
L. Trenor ..	Alfred ..	Lungsickness	Sulwana ..	Location
		Scab	Yalwayo ..	,,
		,,	Dumas ..	,,
		Lungsickness	Uyimbi ..	,,
		,,	M. Clothier ..	Slexcel
		,,	E M. Etheridge ..	Selhurst
		,,	John Ryan ..	Norburg
		,,	J. J. Oosthuis ..	The Gorge
		,,	J. H Payn ..	Burnside
		,,	Bycla's Kraal ..	T. Lynn's Location
		,,	F. Mzizi ..	Lot 1, Enquabeni
		,,	E. Mzizi ..	Lot "F," Enquabeni
		,,	J. T. Clothier ..	Whitecliff
		,,	Swenyas ..	Blackwater
		,,	G. Larkan ..	Antioch
		,,	Injongaved ..	Rydal Mount
		,,	C. Knox ..	Knoxwood
		,,	Sigumu ..	Lot F
		,,	Ndhlankunzie's Kr'l	Location
		,,	Noganes ..	Harding Gate
		,,	Mncanca s Kraal ..	Mount Pleasant
		,,	Bodhlaginis ..	No. 1 Location
		,,	Mqnnansla ..	Omega
		,,	Spingaan ..	Hawarden
		,,	Jabula and Sonjela	Mount Pleasant
		Scab	Incabi ..	Location
		,,	Makerlu ..	,,
J. Ralfe ..	Lion's River ..	,,	W. M. Henderson ..	Hilton
		,,	Smith & Braithwaite	Loskop
C. T. Vaughan ..	Paulpietersburg ..	,,	P. Allen ..	Welverdiend
		,,	P. Marais ..	Maketeeskop
		,,	L. Moolman ..	Rooipoort
		,,	H. Potgieter ..	Maketeeskop
		,,	G. Combrink ..	Geluk
		,,	J. H. Landman ..	Schiekhoek
		,,	T. Uys ..	Morgenzon
		,,	C. J. Combrink ..	Kuilspruit
		,,	C. J. van Rooyen ..	Jachtpaan
		,,	A. Herbst ..	Schikhoek
		,,	A. Kusel ..	Jachtdrift
		,,	J. C. Boshoff ..	Dordrecht

RETURN OF FARMS UNDER LICENCE *(Continued)*.

STOCK INSPECTOR.	DISTRICT.	DISEASE.	OWNER.	FARM.
C. T. Vaughan ..	Paulpietersburg ..	Scab	P. van Rooyen ..	Leliefontein
		,,	D. Grezel ..	Spilhoek
		,,	E. Dodds ..	Jachtdrift
R. Wingfield Stratford	Newcastle ..	,,	C. Mavuga ..	Koppie Allen
		,,	C. J. Kaap ..	The Nek
		,,	M. Worth ..	Bernard
		,,	M. Morison ..	Leopard Kloof
		,,	W. Osborn ..	Boshoek
		,,	Rapane ..	Walmesley
		,,	W. Moller ..	Mardenash
		,,	W. Steel ..	Botha's Pass
		,,	T. Ball ..	Ruston
		,,	A. P. de Jager ..	One Tree Hill
		,,	H. O. Eksteen ..	De Wetstroom
		,,	Natives ..	Stalkrantz
		,,	H. Hamilton ..	Glendale
		,,	S. W. Reynolds ..	Town Lands
C. E. Walker ..	Portion of Estcourt	,,	Oates, W. E. ..	Oatsdale
		,,	Mrs. J. H. Wallace	Cliffdale
		,,	A. Stuart ..	Glen Stuart
		,,	Natives ..	,,
G. Daniell ..	Vryheid ..	,,	W. F. Hein ..	Geldeloof
		,,	Mrs Heynes ..	Brakpan
		,,	Manqulu ..	Hardvetaa
		,,	Mkelegana ..	,,
		,,	Mzinzati ..	Groenkok
		,,	Kuyeze ..	Mooiplaat
		,,	Jantje ..	Trado
		,,	Sgnangene ..	,,
		,,	Velapi Zondi ..	Bedrog
		,,	A. Zitu ..	Mooiplaats
		,,	Mktshwa ..	Vergelegen
		,,	W. Labuschagne ..	Weltevreden
		,,	Mt ben ..	Kambula
		,,	E. E. Dalton ..	Bethel
		,,	P. Labuschagne ..	,,
		,,	L. Botha ..	Waterfall
		,,	J. B. Thompson ..	Noortverwacht
		,,	E. Potgieter ..	Someweld
		,,	Natives ..	Nooitgedacht
		,,	,, ..	Rustplaats
		,,	,, ..	Berlin
		,,	J. H. Gunter ..	Palmietfontein
		,,	Natives ..	Wagendrift
		,,	,, ..	Prado
		,,	,, ..	Bedrog
		,,	,, ..	Vleiplaats
		,,	T. Curtis ..	Sandhurst
		,,	Natives ..	Dugeraad
		,,	,, ..	Rustenburg
		,,	Mrs B. Webbe ..	,,
		,,	C. Beneke ..	Langkrans
		,,	M. v d Westhuizen	Vaalkopje
		,,	Natives ..	Cranstoot
		,,	,, ..	Prado
J. R. Cooper ..	Nkandhla & Nqutu	,,	Ncede Biyela ..	Mpandhleni
		,,	Mgele Biyela ..	,,
		,,	Natives ..	Engazini
		,,	,, ..	Mkonjana
		,,	,, ..	Macebo
		,,	,, ..	Selutshana
		,,	,, ..	Nqutu
		,,	,, ..	Telezi
E. Vart	Western Umvoti ..	,,	D. C. S. Nel ..	Highfield
		,,	H. Hansmeyer ..	Onres
J. F. van Rensburg	Ngotshe ..	,,	A. J. Swart ..	Reilfontein
		,,	P. J. van Vureu ..	Driefontein
		,,	C. S. Fouche ..	Kondelage
		,,	Mjanja ..	,,
		,,	Natives ..	Langerwacht
		,,	F. M. Borthwick ..	Mooi Vlei
		,,	Natives ..	Mooiklip
		,,	C. J. Vermaak ..	Groenogden
		,,	J. A. Schultz ..	Onvewacht
		,,	J. C. Emmett ..	Goudhoek
J Stewart ..	Bergville ..	Lungsickness	O. Zunckel ..	Rustenburg

RETURN OF FARMS UNDER LICENCE *(Continued)*.

STOCK INSPECTOR.	DISTRICT.	DISEASE.	OWNER.	FARM.
Æ. W. Larkan ..	Umsinga ..	Scab	Amos Nah'ovu ..	Nazareth
		,,	Oyugnlangans ..	Umsinga
		,,	Tabatula ..	Nazareth
		,,	Avon Mdodu ..	Grootvlei
		,,	Mkerenis ..	Gordon Memorial
		,,	Nyonieawye ..	Mazabap
		,,	George ..	Gordon Memorial
		,,	Bolana ..	Ndayance
		,,	Tshantulu ..	Umsinga
		,,	Susezulu ..	,,
		,,	Ngongola & Somseu	,,
		,,	Nthubusu ..	Gordon Memorial
		,,	Movenwa ..	Umsinga
		,,	Sandhlwana ..	,,
		,,	Nyamana ..	,,
		,,	Amos ..	,,
		,,	Foposa ..	,,
		,,	Natives ..	Location
		,,	,, ..	Gordon Memorial
		,,	,, ..	Vaalkop
R. Mayne ..	Eastern Umvoti & Krantzkop	,,	T. H. Dedekind ..	Harding
		,,	J. A. Nel ..	Velregund
		,,	J. T. Martins & ntvs	Brodershoek
		,,	Macai gaui ..	Loots Hoek
		,,	C. H. Havemann ..	Summerford
		,,	Natives ..	Umbuba
		,,	,, ..	Turleigh
		,,	J. P. C. Nel ..	Spitzkop
		,,	W. Turpin ..	Olivefontein
		,,	J. C. Nel ..	Spitzkop
Æ. W. Bowles ..	Ixope ..	,,	Bogwan ..	Arundel
		,,	Nduba ..	Waverley
		,,	Makafana ..	,,
		,,	Njoyetana ..	Lot 29
		,,	Gungatshi ..	Location No. 3
		,,	G. H. Cooper ..	Avetary
		,,	D. E. Hardman ..	Ellington
		,,	Mandemba ..	Lot D.U.
		,,	Tebenga ..	,,
		,,	E. F. Garland ..	Springvale
		,,	E. W. Veley ..	Ayrhorpe
		,,	Gangadene ..	Coolhill
		,,	Solabamba ..	Gorton
		,,	Godhloza ..	,,
		,,	J. Johnson ..	Vlei Cottage
		,,	Bobejana ..	Lot K of 5
		,,	Mangatshu ..	McKenzie
		,,	Boyeni ..	Smithfield
		,,	Koyesa ..	McKenzie
		,,	G. Smith ..	Smithfield
A. H. Ball ..	Weenen	,,	J. P. Lotter ..	Berg Vleit
		,,	P. H. Van Rooyen	Buffels Hoek
		,,	P. P. van Rooyen ..	Doornkloof
		,,	P. J. van Rooyen ..	Middleburg
		,,	G. J. v d Westhuizen	Winterhoek
		,,	G J. v d Westhuizen	,,
		,,	Naude & Lotter ..	Scottshoek
		,,	J. T. van Rooyen ..	Belle Vue
		,,	Mrs. Hair & Sons ..	Oribi Vlakte
		,,	Natives ..	Oribefontein
		,,	,, ..	Scottshoek
		,,	,, ..	Scottspoort
F. Kruger (acting)..	City, Umgeni ..	,,	Umveli ..	Zwaartkop Location
		,,	Dria ..	,,
		,,	Samuel ..	,,
		,,	Jantje ..	,,
		,,	Laduma ..	,,
		,,	L. Taylor ..	,,
		,,	Ramen ..	Ellis' Estate
		,,	J Henwood ..	Hilton Road
A J. Marshall ..	Dundee ..	,,	A. C. Vermaak ..	Sigtuma
		,,	T. C. Vermaak ..	Harrisdale
		,,	J. W. de Bruyn ..	Rooifontein
		,,	B. J. Badenhorst ..	Kemenveldt
		,,	L Badenhorst ..	Kelvin
		,,	H. A. J. Davel ..	Kliprug
		,,	C. T. Vermaak ..	Kalderfontein
		,,	H. P. Handley ..	Giba
		,,	D. C. Uys	Parys

RETURN OF FARMS UNDER LICENCE *(Continued)*.

STOCK INSPECTOR.	DISTRICT.	DISEASE	OWNER.	FARM.
A. J. Marshall ..	Dundee ..	Scab	Honeywill & Taylor	Rietbokspruit
		,,	Harvey & Retallach	Slerkstroom
		,,	Natives ..	Conde ford
		,,	,, ..	Ruigtefontein
		,,	A. A. Turton ..	Dundee Town Lands
		,,	McKenzie & Kruger	Dabray
B. Klusener ..	Lower Umzimkulu .	Lungsickness	Nyapu	Berbeck

MANGE IN HORSES EXISTS AS UNDER

Owner.	Farm.	District.
Pinda, Vete & Sobuon ..	Strathsoon	Impendhle
Natives	Olivefonte	Umvot
Natives	Tetworth	Lion's River

Pound Notices.

NOTIFICATION is contained in the *Government Gazette* of the sale, unless previously released, of the undermentioned live stock on the dates specified:

ON THE 4TH AUGUST.

Donnybrook—Black ewe goat; black and white goat with kid. All impounded on the 6th June, 1909, by H. Harris, Colbeck Farm.

Pine Tree Pound, Alexandra—Four black ewe Kafir goats and one black kid; two brown ewe Kafir goats and one brown kid. Impounded by M. Blamey, Clifton Park, Isipofu.

Utrecht—Grey mare, 8 years old, height about 14 hands, lump above each eye, no visible brands; chestnut gelding, about 8 years old, height 14 hands, cut mark left ear, white saddle marks, no visible brands.

Muden, Weenen—Black she goat, no marks; black kid, no marks.

Good Hope, Klip River—Two Merino sheep ewes, one branded I-H, one branded S-O.

Hatting Spruit, Dundee—Brown gelding, aged, black points, near hind foot white, brand indistinct, look, like ʌM, or may be M.

Howick—Running on the farm "Yarrow," and reported by Mr George Trotter as being too wild to catch to send to the Pound: Bay mare, long mane and tail, about 14.2, poor condition, no brands visible.

Inhlazatje, Vryheid—Three black Kafir sheep, ewes; two black Kafir sheep, ewes, white spot on head; red-coloured Kafir sheep, ewe; young black-and-white sheep, ewe, no ears; young red-and-white sheep, ewe; red-coloured sheep, ewe, long tail; three black-and-white lambs; black lamb, various ear marks.

ON THE 1ST SEPTEMBER.

Donnybrook—Bay mare, 13 hands, white star (faint), long tail and mane, no brand, very old, poor condition; ewe goat, chestnut.

Mooi River—Black sow pig, in fair condition, no marks.

Vryheid—On the farm of Sobantu, at the Vleiplaats Kraal, on 15th July, amongst a lot of sheep at present under license, so cannot be brought to the Pound: three stray Merino hamels, brand I-L, also ear marks.

Government Cold Stores and Abattoirs.

PIETERMARITZBURG.

It is notified for the information of Farmers and others that Government is prepared to receive Cattle at the Government Abattoir, Pietermaritzburg, for Slaughter and Storage, if necessary, upon the following Scale of Rates and Charges, or such of them as may meet the requirements of Cattle owners. It must, however, be understood that owners will be required to make their own arrangements for the sale of the meat of cattle sent in for slaughter, the Government being unable to offer facilities or to accept responsibilities in this regard.

Cattle may also be received for slaughter at the Government Abattoir, Point, Durban, at the charges noted below. As the Government is unable to offer facilities for cold storage at Durban, or for the sale of the meat of cattle sent for slaughter, it must be understood that owners will be required to make their own arrangements in these respects, and the Government is unable to accept responsibility in either regard at Durban.

		Calves up to One Year old.	Cattle over One Year old.	For minimum number of 250 head per month.		For maximum number of 500 head per month.	
				Under 300 lbs. weight.	Over 300 lbs. weight.	Under 300lbs. weight.	Over 300lbs. weight.
		s. d.	s. d.	s. d.	s. d.	s. d.	s. d.
1.	Receiving ... ... per head	0 3	0 6	0 6	0 6	0 3	0 3
2.	Killing and Cleaning ... ,,	2 3	3 6	2 9	3 3	2 6	3 0
3.	Labour ... ... ,,	0 3	0 6	0 3	0 6	0 3	0 6
4.	Disinfectants ... ... ,,	0 1	0 1	0 1	0 1	0 1	0 1
5.	Bagging (4 Quarters) ... per body	1 9	3 0	2 6	2 9	2 3	2 6
6.	Cleaning of Tripes ... ... each	0 6	0 6	0 6	0 6	0 6	0 6
7.	Chilling of Beef, up to 72 hours or portion thereof ... ... per body	1 0	2 9	2 0	2 6	1 9	2 6
8.	Chilling of Offal, up to 72 hours or portion thereof ... ... per set	1 0	1 0	1 0	1 0	1 0	1 0
	Chilling and Freezing Beef—						
9.	1st week or portion thereof per body	2 0	4 6	3 9	4 0	3 6	3 9
10.	2nd ,, ,, ,, ,,	1 0	4 0	3 3	3 6	3 3	3 3
11.	3rd and remaining weeks or portions thereof ... ,,	0 8	3 0	3 0	3 0	3 0	3 0
	Chilling and Freezing Offal—						
12.	1st week or portion thereof per set	1 4	1 6	1 4	1 4	1 4	1 4
13.	2nd ,, ,, ,, ,,	1 0	1 3	1 0	1 0	1 0	1 0
14.	3rd and remaining weeks or portions thereof ... ,,	0 9	1 0	0 9	0 9	0 9	0 9

A charge of 1s. per head is made in respect of any Sale of Cattle on leg at the Government Abattoir and a similar charge is made in respect of Bodies of Beef or portions thereof.

For further particulars apply to the Manager, Government Cold Stores.

Department of Agriculture, Maritzburg,
21st December, 1908.

Farm Apprentices' Bureau.

LIST OF APPLICANTS.

THE following is a list of the applicants which have so far been received by the Editor of the *Natal Agricultural Journal* from boys desirous of obtaining positions on farms. Farmers wishing to get into communication with any of these applicants should address their enquiries to the office of this journal.

The majority of the applicants have, of course, had no farm experience, but all appear to be strong, healthy and willing.

No. 2.	Age 15.	Has had 18 months' experience of farming. Understands more about forestry than general farming. Speaks Zulu, and understands Dutch.
,, 3.	Age 24.	Colonial born Has a knowledge of bookkeeping.
,, 4.	Age 18.	Natal born. Anxious to learn farming.
,, 5.	Age 24.	Speaks Zulu. Keenly interested in farming.
,, 6.	Age 17.	Still at school. Speaks French fluently, and has a fair knowledge of German and Dutch. Is very well educated. Particularly anxious to learn farming.
,, 11.	Age 18.	Has had two years' experience on a sheep farm in the O.R. Colony. Is particularly anxious to get back on a farm. Is very willing and obedient.
,, 13.	Age 20.	Is an orphan. Is anxious to learn farming.
,, 14.	Age 16.	Natal born.
,, 15.	Age 19.	Is desirous of learning farming.
,, 17.	Age 20.	Speaks Zulu. Is keenly interested in farming.
,, 25.	Age 23.	Bricklayer by trade. Is anxious to get on a farm.
,, 26.	Age 18.	Has a knowledge of Zulu. Was brought up in a farming district in Scotland.
,, 27.	Age 19.	Has had one year's experience on a farm in the Cape Colony.
,, 29.	Age 15.	Has had experience on a stock and on a mixed farm. Speaks Zulu. Is a good horseman. Is anxious to get on a farm.
,, 30.	Age 18.	Transvaal born Has had experience on a mixed farm. Speaks Dutch and Zulu.
,, 31.	Age 20.	Has a knowledge of engineering and carpentry. Is a Natalian. Anxious to learn.
,, 32.	Age 15.	Has lived on a farm for some years. Speaks Dutch and Zulu fluently. Is very intelligent.
,, 33.	Age 16.	Well educated. Speaks Dutch and Zulu.
,, 34.	Age 18.	Has a slight knowledge of Zulu. Understands carpentry.

Agricultural and Other Shows, 1909.

GREYTOWN (Umvoti Agricultural Society).—Date not fixed. W. H. Gibbs, Box 24, Greytown, *Secretary*.

LADYSMITH (Klip River Agricultural Society).—Date not fixed. E. V. Bambrick, Box 90, Ladysmith, *Secretary*.

SOCIETIES HOLDING NO SHOWS.

Byrne Farmers' Association; Eshowe District Farmers' Association; Richmond Road Farmers' Association; Donnybrook Farmers' Association; Ladysmith Farmers' Association; Hatting Spruit Farmers' Association; Boston Farmers' Association; Little Tugela Farmers' Association; Umvoti Farmers' Association; Highflats Farmers' Club; Vryheid Agricultural Society; Garden Castle Farmers' Assocation; Nottingham Road Farmers' Association; Seven Oaks Farmers' Association; Richmond Agricultural Society; Slangrivier Boeren Vereeniging; Ingogo Farmers' Association; Frere Parmers' Association; Dronk Vlei Farmers' Association; Lower Tugela Division Association; Umsinga Biggarsberg Farmers' Association; Ixopo Farmers' Association; Bergville Farmers' Association; Mid-Illovo Farmers' Club; Upper Biggarsberg Farmers' Association.

Employment Bureau.

THE Department of Agriculture has received applications from the undermentioned, who are prepared to become assistants or apprentices on farms. The Department will be glad to hear from farmers willing to take young men as assistants, and to place them in correspondence with the various applicants. Communications should be addressed to the office of this *Journal*.

No. 115.—Englishman, 26 years of age, steady and an abstainer, with a knowledge of cattle and horses, wishes employment on a farm in Natal (English preferred) as a handy man, with a view to furthering his knowledge of farming in this country. Is willing to accept food and clothing in a good home, for services, for a few months with the prospect of a small wage after the first three months.

No. 116.—Cape man, age 32 years; married, no children. Has been used to working with horses and mules all his life. Has good papers from his previous employers, and was in the employ of the Public Works Department for over five years. Is willing to do anything in his power, but cannot read nor write.

No. 117.—Englishman, 25, of good education, desires appointment as overseer on a plantation in Natal, and would pay a reasonable premium and give services free for a few months if necessary. Has had commercial, engineering, surveying and mining experience.

No. 118.—Pensioner from the Army desires to obtain post on a farm. Is particularly fond of gardening. Has excellent discharge papers and good testimonials.

No. 119.—Lady, experienced in dairy work, is desirous of taking charge of a dairy. Has gone through a course of butter and cheese-making, and holds good testimonials from Mr. J. Marshall Douglas, Chairman of the Royal Agricultural Society of England (1905).

No. 121.—Desires open air employment. Age 43. Life experience of agricultura pedigree and prize stock gained in Scotland. Has been six years in South Africa. First-class references and testimonials. Small salary required.

No. 122.—A young man, with life-long experience of cane-growing, desires employployment as manager or overseer on a plantation. Experience has been in Queensland and Fiji. Is good at figures and capable of taking charge of books if necessary.

No. 123.—Married man, 35 years of age, with 5 years' experience on poultry and stock farm in California, wishes to get on to a farm in Natal. His wife is a good cook and handy in dairy. Would be willing to work for a very small wage or for their keep for a period of twelve months at least, after which they would expect some remuneration. Can produce first class personal references.

FARM ASSISTANCE REQUIRED.

A well-known farmer and wattle grower requires young man to assist manager of his farm at Hilton Road. Experience in farming a qualification. Applicant must be one who has had fair education and who could manage correspondence. Apply by letter, stating previous experience (if any), age and salary required.

Farmers requiring good, steady farm hands would do well to communicate with Ensign Anderson, of the Salvation Army Shelter, Maritzburg, who constantly has good men at the Shelter who would be glad of employment at reasonable rates. Ensign Anderson pledges himself not to recommend for employment any but those he is satisfied will give satisfaction to their employers. He will be pleased to enter into correspondence with any farmer who may address him on the subject.

Division of Agriculture and Forestry Notices.

FEES FOR AGRICULTURAL ANALYSIS.

It is hereby notified that Farmers and others can secure analytical determinations from the Government Laboratory, Central Experimental Farm, Cedara, in accordance with the following scale of fees, which is subject to revision :—

	Scale I. £ s. d.	Scale II. £ s. d.
FERTILISERS AND FEEDING STUFFS :		
Determination of 1 constituent	0 7 6	0 5 0
Determination of 2 or 3 constituents	0 15 0	0 10 0
Complete analysis	1 1 0	0 15 0
SOILS : Partial analysis of a soil in relation to its fertility	1 1 0	0 10 6
Complete analysis of a soil	2 2 0	1 1 0
WATER : Irrigation and drainage	1 10 0	0 10 6
VEGETABLE PRODUCE : Fodder, Ensilage, Grain, &c.	1 10 0	0 15 0
MILK, CREAM, BUTTER : Fat only	0 5 0	0 2 6
,, ,, : Complete	0 15 0	0 7 6
WATTLE BARK AND TEA : Tannin	0 5 0	0 2 6
CATTLE DIPS : Quantitative analysis of 1 to 3 principle constituents	0 10 0	0 5 0
INSECTICIDES :		
Qualitative analysis each constituent	0 5 0	0 2 6
Quantitative ,, ,, ,, ...	0 10 3	0 5 0

Scale No. 1 is applicable to samples handed in by merchants and Dealers, and where trade interests are involved.

Scale No. 2 is applicable to samples forwarded by *bona fide* Farmers and Gardeners.

Samples will be accepted at the discretion of the Director, and must be properly selected and labelled.

The Department reserves the right to publish the results of any analysis performed by it ; and, where such is deemed of sufficient public interest, it will remain at the discretion of the Director to remit any charges hereunder.

TREES FOR SALE.

To encourage tree-planting, transplants and seeds of forest trees are supplied by Government, so far as in stock, at the undermentioned rates, exclusive of carriage, from the Government Nursery, Central Experimental Farm, Cedara.

Transplants of Eucalyptus, Pines, Acacias, Casaurinas, Cupressus, etc., about 25 trees in each tin, at 8s. 4d. per 100 trees. Trees in separate tins at 1s. each.

Transplants of scarce kinds, larger trees, or surplus stock, when available, will be charged at special rates, which will be furnished on application.

Tree seeds, in variety, at 6d. per packet. Price per pound, which fluctuates, will be furnished on application.

Package and postage of seed, when required, charged 1s. per lb. extra.

PURCHASE OF TREE SEEDS.

With a view to the encouragement of seed production in the Colony, offers are invited from persons having locally-grown seed of exotic trees for Sale. Not less than one pound will be purchased ; and a specimen bearing seed vessels or flowers should be sent for identification purposes.

SILVER POPLAR.

Root suckers of the Silver Poplar (*Populus alba*) can be supplied in any quantity, at 8s. 4d. per hundred, on application.

MAIZE SEED.

Growers who may have for sale selected seed of the following types of maize are invited to communicate as early as possible with the Director, Cedara :—Horse Tooth, Hickory King, Boone County, Golden King and Yellow Dent.

POULTRY.

Orders will be received for selected cockerels of the following breeds for immediate delivery :—Buff Orpingtons, White Minorcas, Silver Wyandottes and Plymouth Rocks,

PERSIAN SHEEP.

An imported Woollen Persian Ram may be hired for the season at a fee of £5, at hirer's risk. Particulars on application. Orders for Haired Persian Rams will be booked for future delivery.

DEVON BULLS.

Offers are invited for three young South Down bulls, by imported bull, "Star of the West." Inspection can be arranged to suit intending purchasers.

CORRESPONDENCE.

Communications relating to the following subjects should be addressed in the first place to the officers responsible :—

Admittance of Students to the School of Agriculture.—House Master, Cedara.
Analyses of Soils, Fertilisers, etc.—Analyst, Cedara.
Felling Licenses, Purchase of Timber Sections and Squatters' Holding in Crown Forests.—Chief Forest Officer, Ixopo.
Afforestation, Timber Trees and Seeds.—Chief Afforestation Officer, Cedara.
Agricultural Seeds, Livestock, etc.—Farm Manager, C.X.F., Cedara.
Tropical Plants, Seeds, etc.—Manager, Government Farm, Winkle Spruit.
Agricultural Seeds, etc., for Irrigation Farming.—Curator, Government Station, Weenen.
Fruit.—Orchardist, Cedara.
Accounting Business.—Accounting Clerk, Cedara.

E. R. SAWER,
Director, Division Agriculture and Forestry,
Cedara.

Land and Agricultural Loan Fund.

The Land and Agricultural Loan Fund has now been established, and the Board are prepared to receive applications for advances on security of first mortgage on fixed property. Applications must be made upon special printed forms, which can be obtained, together with full particulars as to the conditions under which advances are made, from the office of the Fund, Colonial Offices, Pietermaritzburg.

All Correspondence should be addressed to the Secretary, Land and Agricultural Loan Fund, P.O. Box 357, Pietermaritzburg.

Executives of Farmers' Associations.

*** *The Editor will be obliged if the Secretaries of Farmers' Associations and similar institutions will kindly keep him advised with regard to changes in the* personnel *of their Executives.*

ALEXANDRA AGRICULTURAL AND HORTICULTURAL ASSOCIATION.—President: Wm Thompson. Hon Vice-Presidents: A Blamey, E W Hawksworth, Thos Kirkman, H Basley, J L Knight, R.M. Hon Secretary and Treasurer: Geo Lamb. Hon. Auditor: W B Brunner. Committee: W Arnott, H G Arbuthnot, R C Archibald, R G Archibald, J Bazley, A Behrmann, W Cooke, G J Crookes, R Cruickshank, H D Hawksworth, H E Hawksworth, A F W Hawksworth, R C Hawksworth, J Landers, D McAndrew, F Nelson, C A Preston, Dr. Rouillard, W A Gilbert, Fred Blamey, Rev B M Ford, S C Hawksworth, J C Landers, S F Crookes, J J Crookes, R A Lindsay, J A Curle, F B Preston, R Parkin, H Reynolds, J B Stewart, C Taylor, H H P Waller, J Ross, Rev W C Wilcox, Dr W P Tritton.

ALFRED COUNTY FARMERS' ASSOCIATION.—President: A G Prentice, J.P. Vice-Presidents: C Knox, J.P., L T Trenor, and C A Holwell. Hon. Secretary and Treasurer: H C Hitchins. Committee: C M Etheridge, R Fann, J.P., V Hitchins, S Aitchison, J.P., W B Rethman, Dr Case, J.P., H Rethman, R G Mack, J Hogg.

BOSTON FARMERS' ASSOCIATION.—President: Thos. Fleming, J.P. Vice-President: T. W. Rudland. Hon. Secretary: W. J. Fly, J.P. Hon. Treasurer: H. A. Phipson.

CAMPERDOWN AGRICULTURAL SOCIETY.—President: John Moon, J.P. Vice-Presidents: J Gavin and John W Harvey, J.P. Hon Secretary: W E Allsopp.

CAMPERDOWN AND DISTRICT FARMERS' ASSOCIATION.—President: John Moon, J.P. Vice-President: F N Meyer. Hon Secretary: J Baker. Committee: H Baker, J Gavin, J W Harvey, J.P., W B Turner, H H Hutton, C Baker, H E Meyer.

CHARLESTOWN FARMERS' ASSOCIATION.—President: Johannes Vos. Vice-President: — Adendorff. Secretary: W. J. Curnow. Treasurer: J. O. Thomas. Committee: H. O. Eksteen, J. P. Vos, J. C. Uys, W. G. Thomas, D. Doyer, F. A. R. Johnstone, M.L.A., G. E. Lane, S. R. Higgins, B. F. Johnstone, A. J. Johnstone, J. J. Eksteen, R. H. Greaves, Peter Thompson, G. McArthur, and V. B. van Rooyen.

DRONK VLEI FARMERS' ASSOCIATION.—President: Capt Perceval. Vice-President: Alban Hodson. Hon Secretary and Treasurer: Edward Marriott.

DUNDEE AGRICULTURAL SOCIETY.—President: T. P. Smith. Vice-Presidents: The Minister of Agriculture, the Mayor of Dundee, Messrs. A. L. Jansen, F. Thurton, and W. Craig. Hon. Secretary and Treasurer: J. McKenzie. Committee: A. W. Smallie, W. J. H. Muller, G. M. de Waal, B. J. Humann, R. Retallack, H. Ryley, H. J. Head, C. T. Vermaak, H. P. Walker, J. Dyson, H. Wiltshire, J. Campbell, H. Greenhough, D. W. H. Tandy.

DURBAN AND COAST SOCIETY OF AGRICULTURE AND INDUSTRY.—President: E. W. Evans. Vice-Presidents: Sir B. W. Greenacre, A. M. Campbell, Hon. Marshall Campbell, M.L.C., W. Adams, Frank Stevens, C.M.G., M. S. Evans, M.L.A., P. D. Simmons, W. R. Poynton, Hon. C. G. Smith, M.L.C., G. S. Armstrong, M.L.A., H. R. Bousfield, W. G. Brown, C. Henwood, J. Livingston, John Nicol,, C.M.G., H. H. Puntan, R. H. Wisely, V. Seymour, H. Sparks. Secretary: John Morley. Committee: J. Ellis Brown, J. Burman, C. A. L. Bull, D. Doyle, Samuel Deane, James Henderson, W. Konigkramer, W. D. Kimber, W. J. Mirrlees, W. Milne, J. Swales, W. J. Thompson, C. Wilson, Wilfred Payne, Wallis Short, S. T. Amos, J. McBride, F. M. Hillier, W. A. Stocken, and W. A. Bath. Treasurer: Edwin Greenacre. Auditor: W. Murray Smith.

DURBAN COUNTY FARMERS' ASSOCIATION.—Patron: J H Colenbrander. President: J McIntosh. Vice-Presidents: H Westermeyer, R R McDonald. Committee: F R W Bœhmer. G Compton, H Freese, W Freese, W Gillitt, H W Kœnigkræmer, H W Nichols, F Schæfermann. Hon Secretary and Treasurer: Frank J Volek.

EMPANGENI AND DISTRICT SUGAR PLANTERS' AND FARMERS' ASSOCIATION.—President: Col. C. B. Addison. Vice-President: P. Stott. Secretary and Treasurer: F. Piccione, P.O. Empangeni. Executive: P. Addison, G. Higgs, — Salveson, — Blake.

ESHOWE DISTRICT FARMERS' ASSOCIATION.—President: J R Pennefather. Vice-President: C F Adams. Secretary: T Parkins. Treasurer: W T Brockwell.

GOURTON FARMERS' ASSOCIATION.—Chairman: M Sandison. Vice-Chairman: R Gray. Hon Secretary and Treasurer: Frederick B Burnard, Highfield P.O. Committee: Dr Landon, J.P., E Reed, J Woods, C van der Merwe.

HATTING SPRUIT FARMERS' ASSOCIATION.—President: A W Smallie. Vice-President: Thos Brookes. Hon Secretary and Treasurer: R J Hearn. Committee: G Queddon, N Glutz, Wm Craig, W R Quested, W T Heslop, Thos Dewar, A E Norman, D P Campbell, J J Grove, H J Hearn, D W H Tandy, J B Pendar, J Campbell, J Barbour.

HIMEVILLE AGRICULTURAL SOCIETY.—President: Henry C Gold, Dartford, Underberg. Vice-Presidents: F E Peto, G H Royston, J B Nicholson. Hon Secretary and Treasurer: G Palframan, Watermead, Underberg. Executive Committee: G Malcolm, W S Johnston, P McKenzie, F E Peto, J S Gordon. Yard Steward: D T Malcolm. Auditors: T C Dearlove and F E Peto.

HOWICK FARMERS' ASSOCIATION. — Chairman: Thos Morton. Vice-Chairman: M A Sutton. Hon Secretary and Treasurer: A Clark.

INGOGO FARMERS' ASSOCIATION.—President: E. W. Noyce. Vice-Presidents: G. A. Fimstone and D. A. Drummond. Hon Secretary and Treasurer: C. Drummond.

IXOPO AGRICULTURAL SOCIETY.—President: F L Thring, J.P. Vice-Presidents: Col W Arnott, B.M.R., W K Anderson, J.P., C E Hancock, J.P. Committee: John Anderson, Thos Allen, J C Auld, H D Archibald, F S Beningfield, S Boyd, T L Clarence, F E Foxon, R.M., Wm Foster, Jas T Foster, C C Foster, Geo E Francis, L Gray, A M Greer, J.P., J R Greer, Wm Gold, H A Hill, C F Harris, A E Keith, R Kennedy, Geo Martin, W Oakes, L J Phipps, T F Remfry, J W Robinson, Jas Schofield, M.L.A., D C Smail, A Stone, W R Way, A H Walker, M.L.A., P D Webb. Hon Secretary: G C Way, Hon Assistant Secretary: A G Harris. Hon Treasurer: T Arnott.

IXOPO FARMERS' ASSOCIATION.—President: C. E. Hancock, J.P. Vice-Presidents: T. F. Remfry and R. Vause. Hon. Secretary and Treasurer: Geo. E. Francis, Morningview, Ixopo. Delegates to Farmers' Union: Col. Arnott and T. F. Remfrey, with W. D. Campbell as reserve. Committee: John Anderson, W. Oakes, D. Campbell, G. C. Way, James Foster, A. Keith, G. Martin, F. Z. Thring, A. C. Kirkman.

KLIP RIVER AGRICULTURAL SOCIETY.—President: Daniel Bester, Vice-Presidents: Herman Illing, J G Bester, Wm A Illing. Secretary and Treasurer: Edward V Bambrick (Box 90, Ladysmith). Executive Committee: A Brink, J Farquhar, C.M.G., M.L.A., W C Hattingh, J G Hyde, Trev Hyde, A I Horsley, W Freer, L A Leonard, H Nicholson, H C Thornhill, Herman Illing, D Munger, P de Waal, J H Newton, D Sparks, J.P., J T Francis, A W (Gus) Illing, G Pinkney, W Cochrane, George L Coventry, and *ex officio* officers.

KRANTZKOP FARMERS' ASSOCIATION.—President: Capt M Landsberg. Vice President: P R Vermaak. Hon Secretary and Treasurer: G T van Rooyen. Committee: C J van Rooyen (Albany), C J van Rooyen (Wonderfontein), J. A. G. Mare, L M van Rooyen, Jnr, R P Martens, J P Nel, Dr Proksch, and F E van Rooyen.

LION'S RIVER DIVISION AGRICULTURAL SOCIETY.—President: Graham Hutchinson. Vice-President: H Nisbet. Executive Committee: H Nisbet, M A Sutton, A J Holmes, J Humphries, Jno Pole, and W A Lawton. Auditor: W J R Harvard. Hon Secretary and Treasurer: Arthur F Dicks, P.O. Box 1, Howick.

LITTLE TUGELA FARMERS' ASSOCIATION.—President: F van de Waal. Vice-President: F G King. Secretary and Treasurer: H L Frances. Auditor: A D Buchanan. Committee: P R Summersgill, F W Holmes, J P Wepenaar, J J Harding, Max Cameron.

LOTENI FARMERS' ASSOCIATION.—President: J A Tod. Vice-President: T Carter. Hon Secretary: A Kennedy Stone.

LOWER TUGELA DIVISION ASSOCIATION.—President: W R Hindson. Vice-President: A E Foss. Hon Secretary and Treasurer: H Curtis Smith (Stanger). Committee: A S L Hulett, F Addison, G Stewart, T G Colenbrander.

LOWER UMZIMKULU AGRICULTURAL ASSOCIATION.—President: D C Aiken, J.P. Vice-Presidents: H Albers and C H Mitchell, J.P. Hon Secretary and Treasurer: W J Plows. Committee: C Manning, J W Aiken, W G Camp, T F Godwin, J Hutton, H Norden and A Borchard. Hon Secretary, Show Committee: J W Aiken. Show Committee: A E Collison, A Borchard, F Knoop, A Ringo, H F Voigts, J Hutton, C Manning, A J Lugg and H Albers. Hon Auditor: J W Aiken.

MID-ILLOVO FARMERS' CLUB.—Chairman: L G Wingfield-Stratford, J.P. Vice-Chairman: B B Evans. Hon Secretary: J W V Montgomery. Assistant Hon. Secretary: A L Wingfield. Hon Treasurer: Jos McCullough.

MOOI RIVER FARMERS' ASSOCIATION.—President: R Garland. Vice-President: C B Lloyd. Hon Treasurer: H A Rohde. Collector: Capt W H Stevenson. Auditor: Claude Scott. Hon Secretary: H B Hall.

MUDEN AGRICULTURAL ASSOCIATION.—President: Thos Thresh. Vice-Presidents: Wm Lilje, E A Grantham. Secretary and Treasurer, C A Selling. Committee: Otto Rottcher, Karl Lilje, Karl Rotter, Herman Schafer, Fritz Torlage, T Braithwaite, Ernest Rottcher, C H Tilbrook, Rev H Rottcher (Hon Life Member).

NEWCASTLE.—President: F A R Johnstone, J.P. Vice-President: C Earl, J.P., Mayor of Newcastle; Angus Wood, J.P., Ingogo; O Schwikkard, C.M.G., Newcastle. Secretary: Wm Beardall. Treasurer: Ed Nicols. Executive Committee: L H S Jones, E Phillips, H C Caldecott, C Watson, G Langley, W A Lang, W J P Adendorff, J E de Wet, O Davis, S W Reynolds, B Pettigrew, G W Thomas, G H Bishop, H R Muir, M C Adendorff, W Napier, P Van Breda, Chriss Botha, G Templar.

NEW HANOVER AGRICULTURAL ASSOCIATION.—President: G C Mackenzie. Vice-Presidents: J C Watt, J.P., and R H Oellermann. Life Member: C A S Yonge, M.L.A. Secretary and Treasurer: W D Stewart, New Hanover. Auditor: J H F Hohls. Committee: W N Angus, E Bentley, W W Bentley, Edward Boast, E E Comins, G R Comins, C Crookes, jun, H Dinkelmann, J Duval, W Fortmann, Dr C H Herbert, J Hillermann, J H F Hohls, H Jacobson, H A Light, G C Mackenzie, A F Mackenzie, T M Mackenzie, J Muirhead, J.P., Oswald Muirhead, G Moe, J.P., J Moe, O Moe, C Oellermann, F Oellermann, C J Oellermann, W Ortmann, J C Otto, E Peckham, J.P., J A Potterill, S Peckham, C M Scott, Rev J Scott, Wm Schroeder, J.P., Owen Solomon, J H Smith, Riby Smith, F Thole, H Vorwerk, H F Westbrook, W H Westbrook, C Westbrook, T Wolhuter.

NOODSBERG ROAD AGRICULTURAL ASSOCIATION.—President: Fritz Reiche, J.P. Vice-Presidents: H Mummbrauer, P Rodehorst, W Dralle, W Wortmann. Committee: W Bartels, F Bosse, H Brammer, A J Bruyns, H Bruyns, Carl Dralle, H Gebers, W Gevers, J H Holley, jun, W C Holley, C Hillermann, L Koch, H Kohler, F E Kuhn, M Maister, H Mereis, A Meyer, H Meyer-Estorf, H W Meyer, K A Meyer, H Misselhorn, W Misselhorn, K Peters, I Pfotenhauer, G Rabe, G Reiche, Joh Reiche, W Rencken, H Rosenbrock, H Schmidt, K Schmidt, Rev Jas Scott, K Seele, F J Smith, J Thies, W Witthoft, P Worthmann, A Worthmann, F Worthmann, H Worthmann. Secretary: Paul Vietzen, P.O., Singletree. Hon Treasurer: E Beurlen.

NOTTINGHAM ROAD FARMERS' ASSOCIATION.—President: B. Greene Vice-President: Geo Ross. Secretary and Treasurer: C J King, Nottingham Road. Hon Auditor: H Singleton.

PIETERMARITZBURGSCHE BOEREN VEREENIGING.—President: D P Boshoff: Secretary: E G Jansen, 313, Loop Street, Maritzburg.

POLELA AGRICULTURAL AND HORTICULTURAL SOCIETY.—President: J Isbister. Vice-Presidents: W H Allwright, J F Alexander, and H Brown. Hon. Secretary and Treasurer: J Anderson Speak. Auditor: A Brown. Executive Committee: J Isbister, W H Allwright, J F Alexander, H Brown, H J Gazzard, G W Foster, J Anderson Speak. Hall Committee: W H Allwright, F Crossley, A Brown, with the trustees—J F Alexander, H E Mingey, and Geo Forder.

RICHMOND AGRICULTURAL SOCIETY.—President: John Marwick. Vice-Presidents: W P Payn, J W T Marwick, C O and J W McKenzie and Chas Nicholson. Hon Treasurer: R Nicholson Hon Secretary: Cecil Williams. Committee: Evan Harries, R A McKenzie H M Moyes, Thos Marwick, J C Nicholson, J W Flett, A W Cooper, J.P., J W Hammond, C E Simes, Tom McCrystal, and the seven office-bearers (*ex-officio*).

RICHMOND ROAD FARMERS' ASSOCIATION.—President: Thos Stead, J.P. Vice-President: W Mapstone. Secretary and Treasurer: W L Stead, New Leeds, P.O. Committee: D Malcolm, J Mapstone, W P Payne, J James, J Sinclair, W S Crouch, H B Boyd, W Middleton, W Oldfield, T E Horwood.

ROYAL AGRICULTURAL SOCIETY OF NATAL.—President: Sir G M Sutton, K.C.M.G. Vice-Presidents: W S Crart, Jas King, D C Dick, G J Macfarlane, C.M.G., O Hosking, with His Worship the Mayor, *ex officio*. Secretaries, Treasurers and Collectors: Duff, Eadie & Co, 12, Timber Street, Pietermaritzburg. Yard Superintendent: H J Stirton. General Committee: T J Allison, W H Buchanan, F G Burchell, W H Cobley, P H Campbell, R Comins, W P Gough, E S Goodwill, K H Hathorn, K.C., T W J Hall, J Hall, L Line, Col Sir D Mackenzie, K.C.M.G., Jas Morton, Sir T K Murray, Jno Moon, W J O'Brien, P Otto, R H Pepworth, J F Potterill, A Robinson, Rev J Scott, P D Simmons, H Solomon, W L Stead, H J Stirton, Dr Oddin Taylor, F W Jameson S J Mason. Executive Committee: President, Vice-Presidents, and W J O'Brien, W H Cobley, K H Hathorn, K.C., and Col E M Greene. Members appointed by Corporation: Councillors Ireland, Sanders and Hathorn.

SLANG RIVER (UTRECHT) FARMERS' ASSOCIATION.—Chairman: P J Kemp. Executive Committee: J J Uys, J Z Mooln.n, T J Botha, P J Viljoen, P J Kemp. Hon Secretary and Treasurer, Thys Uys, Utrecht P.O.

UMSINGA-BIGGARSBERG FARMERS' ASSOCIATION.—President: E C Nuss. Vice-President and Acting Secretary: Geo S Saunders, Helpmakaar.

UMVOTI AGRICULTURAL SOCIETY.—President: Major T Menne. Vice-Presidents: Theunis J Nel, M.L.A., W J Slatter, W L'Estrange. Executive Committee: Tol Nel, A Newmarch, W Lilje, O Rottcher, S C Van Rooyen, W Newmarch, E J Van Rooyen, O Norton, I M Nel, J Browning. Managers of Show Yard: J M Handley and N Hunter. Hon Auditor: W K Ente. Secretary and Treasurer: W H Gibbs.

UMVOTI FARMERS' ASSOCIATION.—President: P R Botha (J.'s son). Vice-President: J M Handley. Secretary and Treasurer: G E Cadle (Box 6, Greytown). Auditor: J M Nel. Committee: W J Slatter, J G Nel, H F Torlage, R J Landsberg, A Newmarch, P H van Rooyen, A F Handley.

UPPER BIGGARSBERG FARMERS' ASSOCIATION.—President: W L Oldacre. Vice-President: G Langley. Hon Secretary: W F B Sutherland.

UTRECHT AGRICULTURAL SOCIETY.—Chairman: L Viljoen. Vice-Chairman: B H Breytenbach. Members: I Bierman, M M Knight, J H Klopper, B C Hattingh, T Botha, M Gregory, P L Uys, H P Breytenbach. Secretary: G J Shawe.

UTRECHT BOEREN VEREENIGING.—President: D J A van der Spuy. Secretary: G J Shawe, Utrecht.

VICTORIA COUNTY AGRICULTURAL SOCIETY.—President: Lieut-Col F Addison. Vice-Presidents: Sir Liege Hulett, Kt, M.L.A., W J Thompson, Esq, J.P., J Polkinghorne, Esq, M.L.A. Committee: Messrs W H B Addison, G S Armstrong, M.L.A., C Bishop, J.P., D Brown, sen, J.P., W Campbell, T C Colenbrander, A E Foss, J.P., A S L Hulett, J.P., J B Hulett, C Jackson, G Nicholson, J.P., T Polkinghorne, J W Perkins, J.P., E Saunders, J.P., G Stewart, and J H Stansell. Hon Secretary and Treasurer: H Curtis Smith (Stanger).

VRYHEID (WARD I.) AGRICULTURAL SOCIETY.—President: E Dalton. Vice-President: J F Potgieter. Secretary: F Kolbe. Assistant Secretary: H Lombaard. Committee: Secretary, Assistant Secretary, and A von Levetzow, T Ries, P Grobler, F Molman, A Steenkamp.

WEENEN AGRICULTURAL SOCIETY.—President: Allan Stuart. Vice-Presidents: R Garland, R H Ralfe, F I de Waal. Hon Treasurer: F C Schiever. Hon Secretary: E Cautherley. Auditor: S Wolff. Executive Committee: Hon H D Winter, M.L.A., J W Moor, M.L.A., D W Mackay, T H Hindle and L L'Estrange. Manager of Show Yard: S Vaughan. Assistant: A Clouston.

WEENEN COUNTY HORTICULTURAL SOCIETY: Committee of Management: The President and Treasurer of the Weenen Agricultural Society and C J Offord, G W Linfoot, T J Nunn, Dr Brewitt, S Vaughan. Hon Secretary: F Cautherley.

ZULULAND FARMERS' ASSOCIATION.—President: F W White. Vice-President: C E Symonds. Secretary: R H McAlister. Committee: Hon D C Uijs, A W Symonds, H T James, R J Ortlepp, J N R Dixon.

ZULULAND COAST FARMERS' ASSOCIATION.—President: G H Hulett. Vice-President: C Hill. Hon Secretary and Treasurer: F Brammage, Ginginhlovu.

East Coast Fever Advisory Committees.

(NOTE.—Owing to sparse European population, the following Magisterial Divisions have no Advisory Boards: Ubombo, Mapumulo, Ingwavuma, Mahlabatini, Ndwandwe, Nkandhla and Hlabisa.)

ALEXANDRA.—Chairman: W Thompson, Umzinto. Members: H Barley, R C Archibald, A Blamey, H Reynolds, G J Crookes, R Parkin, J A Curle.

ALFRED.—Chairman: Magistrate. Members: A G Prentice, Rev. S Aitcheson, J E Brown, F H Boddy, H M Raw, H Rethman, H C Hitchens, H J R Hatchwell, W P Bouscrie.

BERGVILLE.—Chairman: T E Zunckel, J.P., Bergville. Members: P H Van der Riet, J G Fannin, H Jackson, C Halforty, F Zunckel, Mbulali—Consulting member for natives.

BULWER.—Chairman: Magistrate. Members: R Comrie, Wm Colville, R Gordon, H Cole, P Garson, P McKenzie, G Malcolm, H C Gold, R Justice, E Stafford, W Little.

CAMPERDOWN.—Chairman: A N Kirkman, Cato Ridge. Members: J F Erfmann, P J Kingham, W B Turner, C J A Scheepers, W Mercer, L G Wingfield Stratford, J W Harvey, B B Evans, J W V Montgomery, B R Buchanan, W L Stead. SUB-DIVISIONAL BOARDS.—*No. 1. East of Railway Line from "Spitzkop" to Railway Line.*—Chairman: J F Erfmann, Cato Ridge. Members: P J Kingham, H Dinklemann, F L Meyer, J H Meyer, H A Meyer. *No. 2. East of Railway Line from West of Government Fence.*—Chairman: C J A Scheepers, Thorneybush. Members: W B Turner, W Mills, J F Scheepers, H Nadauld, G S Phipson. *No. 3. West of Railway Line from Koning Krantz to Killairney and along Umlaas River.*—Chairman: A N Kirkman, Clairmont. Members: W Mercer, W Brown, R Godfrey, W S Meyer, E W Meyer. *No. 4. West of Railway Line, rest of Division between Main Line, Umlaas River Boundary of No 3.*—Chairman: W L Stead, Thornville Junction. Members: F H Meyer, J R Schwegmann, W E Schwegmann, W S Crouch, B R Buchanan (Hon. Sec., Manderston). *No. 5. West of Main Line, Beaumont, East of Main Mid-Illovo River from Westley's Drift to Umguaranta River.*—Chairman: J W Harvey, Camperdown. Members: L G Wingfield Stratford, R Lyne, O A Hutton, E H Hayes, F E Groom. *No. 6. Mid-Illovo West of Line, rest of Division South of Umlaas River.*—Chairman: B B Evans. Members: J W V Montgomery, J H McCullough, J Ballam, J James, H S Power.

DUNDEE.—Chairman: F Turton, Glencoe Junction. Members: J Campbell, J J Grove, H Wiltshire, G M De Waal, Aug Jansen, A J Potgieter, A Cronje, A Schuid, H Greenhough. SUB-DIVISIONAL BOARDS.—*Glencoe Sub-area.*—Members: F Turton, H Greenhough, W H Miller, F Schroeder, V Marshall, J Lausen, J J De Jager, Rev Father Rauch (Native interests). *Hatting Spruit Sub-area.*—Members: J J Grove, H A J Davil, A E Norman, J Campbell, Rev J Dewar (Native interests). *East of Helpmakaar Road.*—Members: A M Cronji, D C Pieters, P Meyer, J A Naude, A Jansen. *West of Helpmakaar Road.*—Members: A J G Meyer, A P Lund, D C Uys, A J Van Tonder, Jun, A J Potgieter. Members of Joint Committee for *Area West of Helpmakaar*: A J Potgieter, A P Lund. Members of Joint Committee for *Area East of Helpmakaar*: A Jansen, A M Cronji. *Area between Main Vryheid Railway Lines.*—Members, W Craig, H Wiltshire, C M Meyer, Sen, A Spies, Jun, C M De Waal.

DURBAN BOROUGH.—Chairman: E L Acutt, Durban. Members: H R Bousfield, R Benningfield, G Swales, J Haynes, — Arthur.

EMTONJANENI.—Chairman: Magistrate. Members: F W Smith, H J James, F W White, A W Symmonds, R J Ortlepp, D C Uys, L J Van Rooyen.

ESHOWE.—Chairman: A Boast, Magistrate. Members: A Moore, G H Hulett, C F Adams, T Parkins, A T Wantink, F J Dickens, H H Thole.

ESTCOURT.—*Ward 2. East of Main Line.*—Chairman: A Stuart. Members: Magistrate, J Ralfe, J W Haw, J G Hatting, A Peniston, A B Haviland, G M Rudolph. *Ward No. 3.* (Boundaries): The Bergville Magisterial Division, Tugela

to junction of the two Tugelas; The Winterton Settlement fence to Vaai Plaats fence and Ovington and Sibhamie's Location fence, and from there to Government Game Reserve).—Chairman: H J De Waal, Glenisla. Members: R Gray, M Sanderson, R J Land, A Spearman, H L Bacon. *Ward No. 4* (Estcourt West of Railway Line; follow Bushman's River as far as Mr. Kerr's farm, then Nalaara's Location fence as far as Game Reserve).—Chairman: R H Ralfe. Members: F C Schiever, J Rencken, W Couch, P Male, T L Fyvie, J Hatting, A W J Hatting. *Ward No. 5* (Boundaries: Remainder of District West of Line).—Chairman: H Blaker, Estcourt. Members: W Comins, E B Griffin, H A Woodruffe, Col. Crompton, J Russell, A C Robinson, Jun, A E Downing, A D Shaw, J W Bentley.

GREYTOWN.—Chairman: Paul Hansmeyer, Greytown. Members: D Havemann, A Newmarch, J A Nel, W T Slatter, A T Handley, H S Botha. *Central Board.*—Chairman: P Hansmeyer, Greytown. Members: J A Nel, A Newmarch, W J S Newmarch, T K Taylor, S W Cadle, R J Van Rooyen, E J Van Rooyen, J G Nel.

INANDA.—Chairman: C R Bishop, J.P., Umgeni. Members: R Harrison, W Sykes, Jun, E Dore, W Campbell, R Armstrong.

KLIP RIVER.—*No. 1* (A line from Elands Laagte along the Matawaans and Jononos Kop to the Berg; North line, Dundee boundary: all West of Main Line).—Members: C Mitchell Innes, R M Gray, L Meyer, J C Henderson, C Allen. *No. 2* (O.R.C. line and boundary No. 1). Members: D Bester, A J Marais, W Allison, J Bester, — Brink. *No. 3* (From Klip River Bridge to Sand Spruit, and up Sand Spruit to its source in the Berg).—Members: H A Potgieter, A A Wetherell, B Nel, F Van Rooyen, H Portsmouth. *No. 4* (Rest of Division South and East of Sand Spruit and West of Main Line).—Members: W Leathern, H Illing, J H Newton, E Robinson, G W Willis. *No. 6* (Whole of Division East of Main Line).—Chairman: J G de Waal. Members: R A Smith, H Nicholson, P Cronje, J Farquhar.

KRANTZKOP.—Chairman: L L D Proksch, Krantzkop. Members: L M J Van Rooyen, L M J Van Rooyen, F E Van Rooyen, J H Van Rooyen, J P Zietsman, A Johnson.

IXOPO.—Chairman: Magistrate. Members: Thos Allen, Geo Martin, E Marriott, A Stone, G A Cooper, J.P., Wm Gray, D Campbell, F L Thring, J.P.

LION'S RIVER.—*No. 1* (Southern portion of West of Main Line).—Chairman: U K McKenzie, Lidgetton. Members: R J Spiers, F North, A McLean, J Morphew. *No. 2* (Northern portion West of Main Line).—Chairman: G Ross, Nottingham Road. Members: J Clouston, K Soutar, D Connel, D Smythe. *No. 3* (Southern portion East of Main Line).—J W Dicks, "Rosebank," Howick. Members: W M Henderson, — Buchanan, Jos Raw, H J McKenzie. *No. 4* (Northern portion East of Main Line).—Chairman: H Burgmann. Members: W Methley, G Hutchinson, J J Morton, B Taylor. (The whole of the members of the Sub-Divisional Boards constitute the Central Board with the Magistrate, Lion's River, as Chairman.)

IMPENDHLE.—Chairman: T Fleming, Boston. Members: J Martens, P J Lourens, T Carter, C W Brooke, J W McLean, H Boike, C C Lewis, W S Alborough, W Harrington, C W Roberts, D Tootell. *Sub-Committee appointed for Northern portion of Division* (added to Lion's River Division).—Chairman: P J Lourens, Insinga, *via* Nottingham Road. Members: H Boek, C N Brooke, T Carter, J Martens, J W McLean. *Sub-Committee for Southern portion of Impendhle.*—Chairman: T Fleming, Boston. Members: C C Lewis, W S Alborough, W Harrington, C W Roberts, D Tootell.

LOWER TUGELA.—Members: W H B Addison, A E Jackson, H E Essery, A S L Hulett, J Brown, W O Robbins.

LOWER UMZIMKULU.—Chairman: Col. J F Rethman, North Shepstone. Members: Col. J R Royston, D C Aitken, J.P., C H Mitchell, J.P., G P Beachcroft, Claude Manning, H Albers, N Harper, J S Clarke, A Borchard, T Stapleton, Col. Bru-de-Wold.

MOOI RIVER.—Chairman: W. G. Randles. Members: J. H. Wallace, H. F. Cadle, R. Garland, John Bartholomew, J. W. Johnstone, C. R. Skottowe, J. N. Boshoff, J. R. Lindsay.

MTUNZINI.—Chairman: Magistrate. Members: F Green, G M J Gielink, G Getkate, W Saville, A H Konigkramer.

NEWCASTLE.—*No 1* (to be known as Charlestown-Ingogo District from main line of Railway where it strikes the Southern line of the farm Cloutant West, thence along Western boundary of said farm, thence along S. W. boundary of Tipperary West, thence Southern boundaries of Hamstead, Dumferline and Roodeport, thence along the Northern side of the Botha's Pass main road to where it joins the O.R.C. Boundary, thence along the boundary of the Colony, thence along the Charlestown Fence to where it joins the Railway line near Mount Prospect Gate, thence along the Railway line to Cloutant West).—Chairman: J Vos, Charlestown P.O. Members: W J Adendorff, A J Johnstone, A Paine, A H Trouw, Angus Wood. *No. 2* (Newcastle district Southern boundary of No. 1 along Railway line from Cloutant West, including portion of Town Lands, Newcastle, which by agreement with Government is considered to be West of line, thence along Railway line where it strikes the Southern boundary of the farm Kopjeallen, thence along Southern boundaries of Kopjeallen, The Gardens, and Lincoln to the Ingagane River, thence up the Ingagane up to the farm Falixtowe, along Southern boundaries of Falixtown, Bulwerton, Brooklyn, Stonehenge, Tathamscamp, Hanover, Ellensdale, Endsel, Bejuisel, Stelazies Kop, Mount Blanc, to O.R.C. border fence, thence along O.R.C. boundary joining Southern boundary of No. 1 at Botha's Pass).—Chairman: S W Reynolds. Members: F A R Johnstone, W Moller, J.P., L H S Jones, C Earl, F Meyer, J J Muller, — Van Breda, J Macdonald, J C Adendorff, E Sanders. *No. 3. Dannhauser District* (Bounded by Southern District No. 2 from the Railway line at Kopjeallen to the Berg, thence along O.R.C. border, the boundary between Newcastle and Klip River Divisions, thence along the Railway line to the farm Kopjeallen).—Chairman: W L Oldacre, Dannhauser. Members: Geo Friend, B Harrington, L J Muller, J Eckstein, E Hodson, W Watson, Ted Twyman, G Langley, Don Urquhart. *No. 4* (East of Railway Line, along the boundary between Newcastle and Dundee Divisions from the Railway Line near Dannhauser to the Buffalo River, along the Buffalo River to the junction of the Ingagane, thence along the Ingagane to its junction with the Ineander, thence along the Ineander to the fence of the Newcastle Town Lands, known as the Eastern boundary of the Railway Line, thence along the Eastern side of the Railway Line to the Magisterial Division boundary near Dannhauser).—Chairman: T K Boshoff, Dannhauser. Members: J H Potgieter, H Miller, J H van der Westerhuizen, J J Kemp, W Dicks, C Uys. *No. 5* (the strip of land lying between the Railway Line and the Buffalo River from the Ingagane and Incander streams, which form the North-Western boundary of No. 4 district).—Chairman: E W. Noyce, Boscobello P.O.; members, Geo Matthews, T K Panzera. *Central Board.*—Chairman: S W Reynolds, Newcastle. Members: F A R Johnstone, J Vos, Sen, Angus Wood, W Oldacre, W Watson, E W Noyce, F N Panzera, T R Boshoff, J H van der Westhuizen.

NEW HANOVER.—Central Board. Chairman: E Newmarch. Members: W W Bentley, T C Wolhuter, F Reiche, H Schmidt, E Lindhorst, W L'Estrange, A F McKenzie, W Meyer. *New Hanover Sub-Committee.*—Chairman: E Newmarch. Members: Jno Moe, W W Bentley, W Ortmann, T C Wolhuter, O J Muirhead. *Dalton Sub-Committee.*—Chairman: W L'Estrange. Members: A F McKenzie, R W Smith, G Reddinger, H Rosenbrock, J H Gordon, W Meyer. *Schroeders Sub-Committee.*—Chairman: F Reiche. Members: H Schmidt, E Lindhorst, G Moe, P Rodehorst, H T Rohrs, F Gorden, A Meyer, W Fortmann.

NQUTU.—Chairman: A Barklie, Utrecht. Members: H Wilkins, R L Flindt, W A Westbrook, J W F Hall, Dr. Knight.

PAULPIETERSBURG.—Chairman: N J Els, Viljoen's Rust. Members: J B Rudolph, G J Combrink, A Schutte, A Bester, P H van Rooyen.

PIETERMARITZBURG.—Chairman: B Swete Kelly, Pietermaritzburg. Members: W S Crart, C A Fawcett, W E Goodwin, E G McAlister, E E Hodgson.

RICHMOND.—Chairman: Magistrate. Members: E E Johnson, J Mapstone, G D Alexander, C P Lewis, C Nicholson, W Comrie, John Marwick, W P Payn, A H Cockburn. *Sub-Division No. 2.*—Chairman: G D Alexander, Nel's Rust. *Sub-Division No. 5.*—Chairman: W Oldfield, Fox Hill.

REIT VLEI DISTRICT.—Chairman: D. E. Muir, J.P., Elsmore, Mooi River. Members: P. Otto, J.P., R. J. Van Rooyen, E. J. Van Rooyen, J. G. Nel, A. Kohrs, J. Hooper, Otto Norton (Hon. Secretary).

SEVEN OAKS DISTRICT.—Chairman: W J S Newmarch, Harden Heights. Members: H M Balding, J.P., J Crow, J T Martens, H Mayne, S W Cadle.

UMGENI DIVISION.—Chairman: E. S. Goodwill. Members: F. Schroenn, B. Crompton, C. Arnold, R. J. Potts, A. J. Tyler, F. J. Smith, A. Wood, J. P. Symonds, J. J. Potterill, W. H. Keytel, C. Lund.

UMLAZI.—Chairman: C Henwood, Durban. Members: W Pearcer, W Gillett, H Freese, L Jackson, P W Mackenzie.

UMSINGA.—*No. 1 District* (All farms lying West of the Umsinga-Helpmakaar main road).—Chairman: E C Nuss. Members: W W Strydon, J.P., J H Nuss. *No. 2 District*—(All farmers East of the Umsinga-Helpmakaar main road—excepting the farms Sutherland, Gordon, Memorial Mission and Pomeroy Town Lands, and Location lying North of the Mazabeko and West of the Buffalo River. —Chairman: W H Wholberg, P.O. Elandskraal. Members: H W Dedekind, J Dedekind. *No. 3 District*—(The remaining portion of the area lying in the Umsinga Division).—Chairman: A Muller. Members: M J Matheson, H Muller. The three Committees to constitute the joint Committee.

VRYHEID.—Chairman: A von Levetzow, Vryheid. Members: P Labuschagne, B E A Rabe, G M van der Westhuizen, J Kruger, J F Potgieter, L M N Nel.

WEENEN.—Chairman: C G Jackson, Weenen. Members: C Harding, J.P., P J van Rooyen, J.P., K Rottcher, S B Buys, J J Vermaak, L C Kinsman, J W A Pole, C F Vermaak, P R Buys, J C's son.

Publications Issued by the Department of Agriculture.

THE following publications, issued by the Department of Agriculture, are still in print, and copies may be obtained free (except those with price attached) upon application to the office of the *Agricultural Journal*, Department of Agriculture, Pietermaritzburg. The figures in square brackets (*e.g.* [1904]) are the years in which the various publications were issued.

No. BULLETINS.

2.—"Manures on the Natal Market, 1902," by Alex. Pardy, F.C.S., Analyst. [1902.]

4.—"Manures on the Natal Market, 1903," by Alex. Pardy, F.C.S., Analyst. [1903.]

6.—"Manures on the Natal Market, 1904," by Alex. Pardy, F.C.S., Analyst. [1904.]

7.—"Tree-planting in Natal," by T. R. Sim, F.L.S., Conservator of Forests. [1905.] (*Price 2s. 6d., post free.*)

8.—"Agricultural Co-operation," by E. T. Mullens, Secretary, Minister of Agriculture. [1905.]

10.—"Manures on the Natal Market, 1905," by Alex. Pardy, F.C.S., Analyst. [1905.]

11.—"East Coast Fever," by S. B. Woollatt, Principal Veterinary Surgeon. [1906.]

12.—"Manures on the Natal Market, 1906," by Alex. Pardy, F.C.S., Analyst. [1906.]

13.—"Report on the Disease known as 'Bluetongue' in Sheep," by H. Watkins-Pitchford, F.R.C.V.S., F.R.S.E., Govt. Bacteriologist and Director, Govt. Laboratory. [1908]

14.—"Poultry-Keeping in a Simplified Edition for Farmers," by F.C. [1908.]

15.—"Some Common Bagworms and Basketworms," by Claude Fuller. [1909.]

REPORTS.

Annual Report of the Agricultural Department, 1902. (Includes Reports of the Director of Agriculture, Entomologist, Conservator of Forests, Dairy Expert, Editor *Agricultural Journal*, etc.) [1903.]

Report of the Secretary, Minister of Agriculture: January 1, 1903, to June 30, 1904. [1905.]

Report of the Secretary, Minister of Agriculture, for the year ended 30th June, 1905. [1905.]

Report of the Secretary, Minister of Agriculture, for the year ended 30th June, 1906. [1906.]

(For a continuation of the statistics given in these reports see reprint "Natal's Progress in 1906," noted below.)

Fourth Report of the Government Entomologist: 1903-4. [1905.]

Fifth Report of the Government Entomologist: 1904-5. [1906.]

Sixth Report of the Government Entomologist: 1905-6. [1907.]

(The Third Report of the Entomologist is included in the "Report of the Agricultural Department, 1902," noted above.)

Report of the Conservator of Forests, 1902. [1903.]

Interim Report of the Conservator of Forests up to December 31, 1905.

Report of the Principal Veterinary Surgeon, for year ended 30th June, 1906. [1907.]

First Annual Report of the Land Board, 1905. [1906.]

Annual Report of the Land Board, 1906-7.

MISCELLANEOUS REPRINTS, ETC.

Black Spot ("Letter Book Pages": reprinted from *Journal*.)
Mealie Grubs (do do)
Mosquitoes (do do)
Woolly Aphis (do do)

Cotton. By A. N. Pearson, Director, A. E. & C. (Reprinted from *Journal*: 1904.)

Co-operation. By E. T. Mullens, Secretary, Minister of Agriculture. (Reprinted from *Journal*: 1907.)

Citrus Fruit Export. (Reprinted from *Journal*: 1907.)

Natal's Progress in 1906. (Reprinted from *Journal*: 1907.) The statistics contained in this paper are on the same lines as those in the Annual Reports for previous years of the Secretary, Minister of Agriculture.

Natal's Progress in 1907. By H. J. Choles, F.S.S. (Reprinted from *Journal*: 1908).

Fibre Cultivation. (Reprinted from *Journal*: 1907.) This paper is a summary of Bulletin No. 13 of the Department of the Interior, Bureau of Agriculture, Manila.

Sisal, Mauritius Hemp and other "Aloe" Fibres. By T. R. Sim, F.L.S., Conservator of Forests. (Reprinted from *Journal*: 1907.)

The Fibre Industry of Mauritius. By Leonard Acutt, J.P., Tongaat; Member of the Land Board, Natal. (Reprinted from *Journal*: 1907.)

South African Products Exhibition, 1907. Report of T. R. Sim on the Natal Exhibits. (Reprinted from *Journal*: 1907.)

Poplar Timber for the Local Manufacture of Matches. By E. R. Sawer, Director, E.S. (Reprinted from *Journal*: 1908.)

Agricultural Industries and Land Settlement in Natal. [1907.]

Judging Fruit, Flowers, Plants and Vegetables at Shows. By T. R. Sim, F.L.S., Conservator of Forests. [1906.]

Agricultural Statistics, Natal, 1905-6. [1907.]

Model Rules for Agricultural Co-operative Societies. (*Price 1s., post free.*)

Government Laboratory.

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Biological test for Tubercle	1	1	0
Throat-swabs for Diphtheria (prepared swabs obtainable on application) :			
Bacteriological Report	0	2	6
Urine, ordinary clinical examination	0	5	0
Quantitative estimation of glucose	0	10	6
Biological test for Tubercle	1	1	0
Fæces, for Ankylostomiasis	0	2	6
Blood (collecting outfit obtainable on application) agglutination test for Typhoid (Widal), Paratyphoid, Malta Fever, etc.	0	5	0
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Mallein, per dose...	0	4
Tuberculin, per dose	0	4
Anti-Venene (for snake bites), per dose	5	0
Blue Tongue Vaccine, per 25 doses	2	0
Blue-Tongue Curative Serum, per 50 cub. c.	2	6
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Q. E. V., Double Inoculation, per dose	0	6

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Brands Allotted to Infected Magisterial Divisions.

The following is a list of the brands which have been allotted to the several infected Magisterial Divisions:—Durban County, D. 2; Alexandra County, A. 2; Lower Tugela, T. 2; Mapumulo, S. 2; Inanda, B. 2; Umsinga, U. 2; Dundee, X. 2; Vryheid, V. 2; Ngotshe, H. 2; Paulpietersburg, P. 2; Nongoma, G. 2; Mahlabatini, L. 2; Ndwedwe, N. 2; Weenen County, W. 2; Umvoti, F. 2; Hlabisa, K. 2; Eshowe, E. 2; Ladysmith, R. 2; Babanango, O. 2; Ladysmith, East of Line outside infected area, R. 3; Utrecht, Z. 2; Krantzkop, 2 K.; Umvoti Location, 2 F.; Ladysmith, West of main line of Railway, R. 3 on left neck; Pietermaritzburg City, 2 P.; Umlazi Location (Upper Umkomanzi portion), 2 U.; Umgeni Division, west of line, J. 2; Lion's River, east of line, 2 H.

Diamond Drilling.

SOME of the departmental diamond drilling plants are at present disengaged and available for hire for boring for either minerals or water. Particulars as to terms of hire may be obtained from the undersigned.

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THIS YEAR—1909.

Seventeen 1st Prizes and Four 2nd Prizes for their various Agricultural Implements and Machinery at the Johannesburg Show.

1st Prize for "Best Collection Agricultural Implements and Machinery" at the Volksrust, Bethlehem, Harrismith, Heilbron, Kokstad, and Johannesburg Shows.

Seven 1st Prizes and one 2nd Prize for their Implements and Machinery at the Pretoria Show.

1ST PRIZE for their "Rex" Cream Separator at the Bethlehem Show, and also Special Diploma at Harrismith and Kokstad Shows.

1ST PRIZE for "Best Collection Dairy Utensils" at the Bethlehem Show.

1ST PRIZE for their famous "Columbia" Plow at the Bethlehem Show.

1ST PRIZE for their "Pearl" Windmill at the Bethlehem Show.

1ST PRIZE for their "Northson" Mealie Sheller at the Harrismith Show.

GOLD MEDAL for largest number of Points in the Implement and Machinery Section.

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G. NORTH & SON were awarded:

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1st Prize for their "Empire" Two-Furrow Plow in the Two-Furrow (Light Class) Competition.

Special Prize for their famous "Columbia" Double Furrow Plow in the Two-Furrow Competition.

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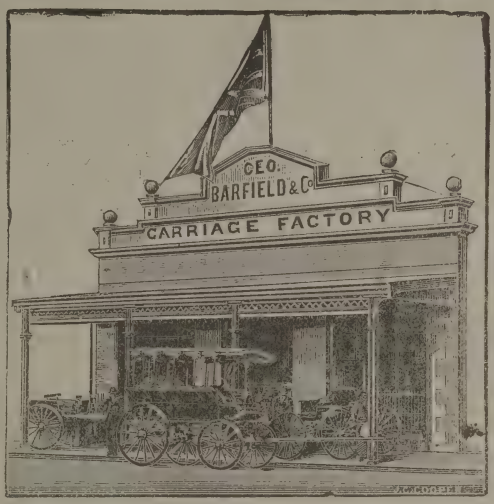
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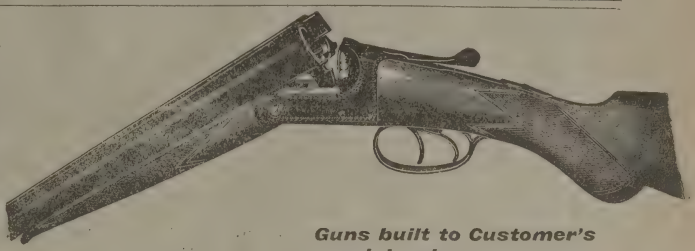
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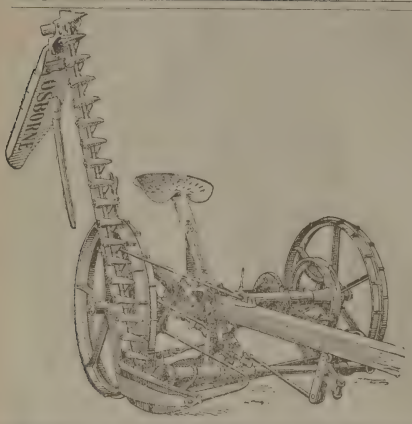
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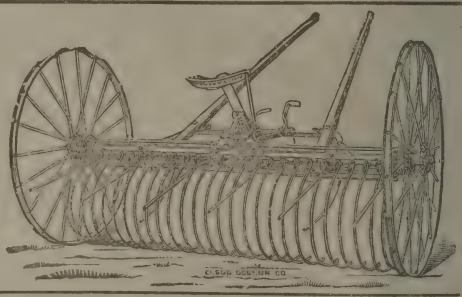
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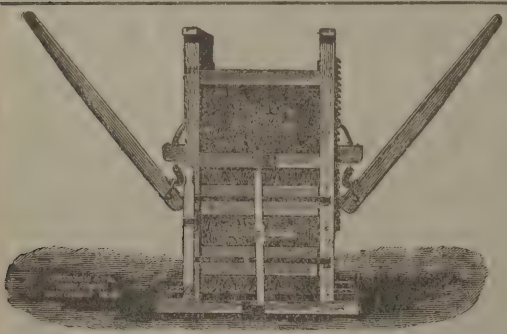
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To fix on wheel of mower are perfect Models of easy working and true grinding.

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These Presses are light, strong and compact. Suitable for baling Forage, Cotton, Straw, Wool, Tobacco, Rags, Alfalfa, Sisal, etc.

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Made almost entirely of Steel and Iron. It is light, rapid, powerful and durable.
Weight about 2,800 lbs.
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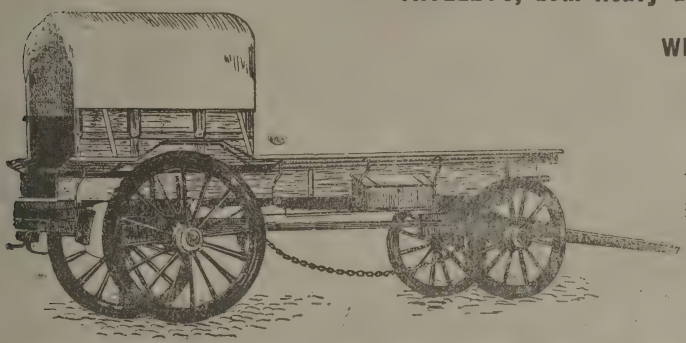
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TO SOUTH AFRICAN FARMERS, SHEEP BREEDERS AND BUTCHERS.

A Common Disease of Sheep in South Africa which is often the cause of serious loss both to the breeder and the butcher.

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of the

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ITS NATURE, AND HOW IT MAY BE PREVENTED.

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Butchers and Breeders in South Africa have long been familiar with the appearance, in the intestines of slaughtered sheep, of little lumps of what they believe to be sand or flint embedded in the gut. In some parts of the country every sheep slaughtered is found to have these deposits, in greater or less numbers, in the intestines. When they are present even in small number the gut is quite unfit for the making of sausage skins; when they are present in large numbers the flesh of the animal is found to be so poor as to be hardly saleable.

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IN SHEEP AND GOATS

AND

Preventative for Tapeworm in Lambs.

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At Last! ***A Certain and Safe Cure and Preventative for Wire Worm in Sheep.***

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Safe cure for worms in Horses and Cattle discovered by a South African farmer. Now packed in strong cardboard cartons.

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All orders and enquiries receive the prompt personal attention of the Proprietor and Manufacturer,

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FOR

Spiders, Buggies, Carts, etc.,

We are holding our own against all comers.
We have won 7 Medals in six weeks at 3 Shows.

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Get our prices and photos and copy of testimonials. All wheels made at our factory. Note address—

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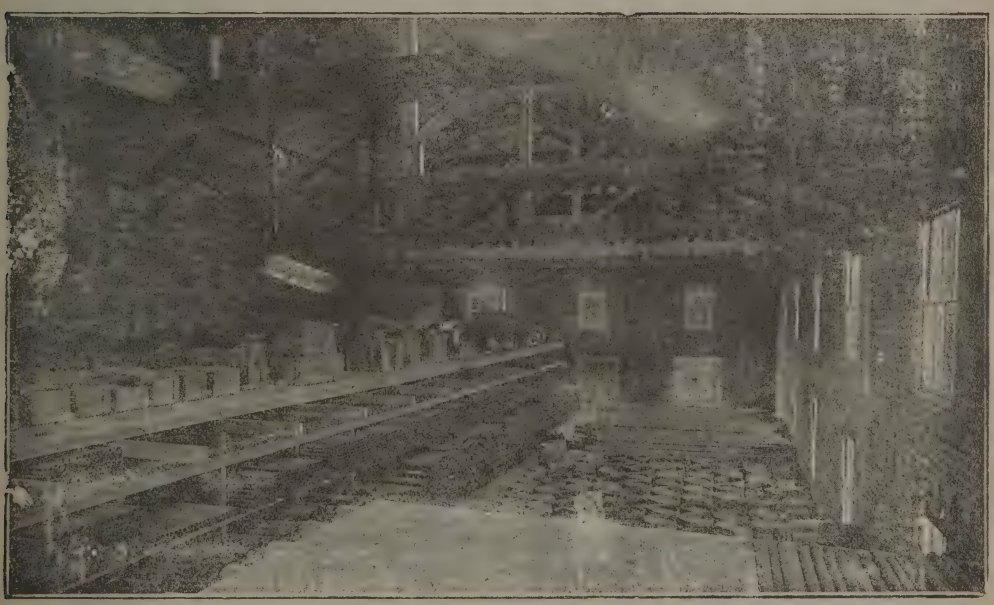
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RESERVE FUNDS EXCEED TWO MILLIONS.

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It will pay you to communicate with above before selling elsewhere.

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RACE HORSE FOOD A SPECIALITY.

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SHEEP FLUID DIP (Non-Poisonous).

The most efficient emulsifying Dip on the market, without exception. Thousands of gallons sold in the Colony annually.

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In cases containing 48 packets. Mixes readily, cures the SCAB, kills the parasites as they hatch from the egg; improves the wool.

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INFALLIBLE FLUID.

A powerful but cheaper Disinfectant.

KEROL SANITARY POWDER.

Guaranteed to be four times more powerful than a 15 per cent. Carbolic Powder.

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ALL WORKED ON ROUGH LEMON STOCK AND GUARANTEED TRUE TO NAME.

Buds taken from Selected Bearing Trees only

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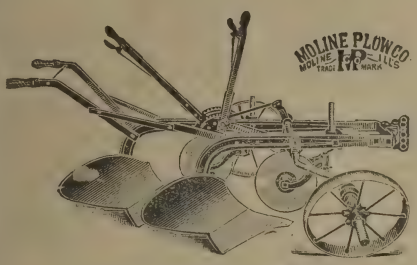
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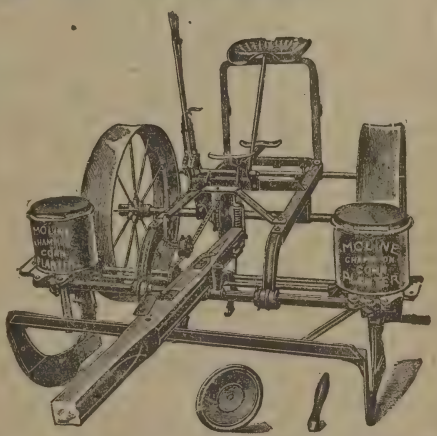
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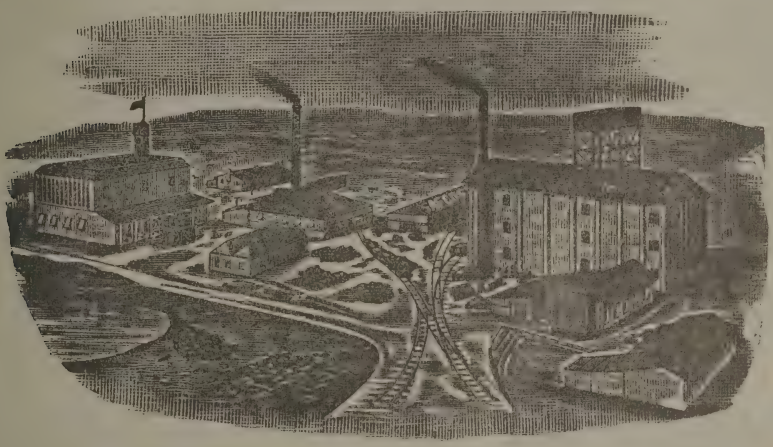
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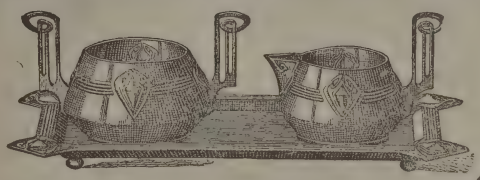
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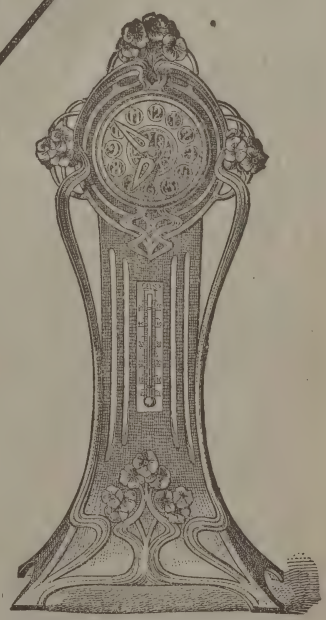
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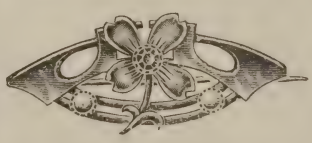
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MAIZE-HARVESTING AT CEDARA.

VOL. XIII., NO. 2. AUGUST 27TH, 1909.

The Natal Agricultural Journal.

Ostrich Farming.

Is Natal a country in which ostrich farming could be carried on profitably over a considerable area? To most the answer to this question has appeared doubtful; to the minds of a few the matter is a settled certainty. Then why, one may reasonably ask, if ostrich farming has been found possible and profitable by a few, have not more farmers taken up this branch of farming? Why?—tell us why more branches of farming activity are not taken up in this country, and we will tell you that apathy is not absent among the farmers of Natal. We do not, however, say that apathy has been entirely responsible for the lack of progress which ostrich farming has made in Natal, but it is an element which has been present to a sufficient extent to be taken account of. To apathy must be added disinclination to take the initiative, or to risk where others perhaps do not appear to have adequately proved. To these considerations again, which have served as a bar to progress, must be added the discouraging and sometimes disastrous effects of want of experience and, when experience has not been wanting, of

"The slings and arrows of outrageous Fortune"—

which perhaps in no other ordinary sphere of human life are felt so keenly as in the sphere of the farmer—and no less in Natal than elsewhere. These adverse circumstances over which man has no control—hailstorms, droughts, untimely rains and untimely frosts, stock plagues, locusts and insect and fungus pests generally—serve from time to time as dampers upon the enthusiasm of farmers starting new branches of farming, taking up new crops and fresh forms of live stock, but their efforts are rarely so disastrous as to act as a complete deterrent against enterprise in farming. Considering individuals, we must put down a very considerable proportion of their failures, and so of the lack of progress in any given line of activity, to inexperience; considering the country collectively, we must to an appreciable extent place to the credit of apathy, and to an equal if not a greater extent to the credit

of unwillingness to incur risks in an unknown sphere, the little progress which often characterises the inception of new industries.

To ostrich farming in Natal as well as to other branches of farming these remarks apply. Ostrich farming has been carried on for many years in this Colony; it has been proved by, we think, all who have tried it an industry well suited to many parts of the country; yet at the present day the number of farmers who are carrying it on can be counted on the fingers of one's hands. The industry is a possible one: why is it not carried on more extensively? Our reply is: it has been *proved* a profitable industry for Natal, but it must be "*boomed.*" "Show us," says the farmer, "by the force, not of one, but of many examples that ostrich farming *will* pay; tell us what crops to grow, and so what conditions of climate and soil are required; teach us how to manage ostriches, how to rear them from the hatching of the eggs to the marketing of the feathers; help us to start, and then we will help ourselves." First, then, we want the shining examples who are going to show that ostrich farming does pay—and they must be considerable in number in order that the lustre of their example may be the greater. This means, in other words, that we want a number of enterprising men to step forward and take up ostrich farming; there are a few who have been at it for years and who, we think we are right in saying, find it a no mean source of income: the example of these few must be followed by a few more, and the stimulating effect upon the farming community generally will be to increase interest in ostrich farming and gradually to establish the industry as one of the staple ones of the Colony. What crops should be grown, what conditions of climate and soil are required, how ostriches are managed and how the feathers are obtained and marketed: these things also the farmer must know. Information on these points—in fact, fairly full information on ostrich farming—has been published in the *Journal*, and we would direct attention in particular to the following issues, *viz.*: November 9th, 1900; August 23rd, 1907; and November 29th, 1907.

We have said that it is not sufficient to assert that ostrich farming in Natal is a sound proposition—even though the assertion is made upon the strength of the experience of half a dozen progressive men;—the proposition must be "boomed." That is to say, expert opinion upon the possibilities of the country should be obtained, the soundness of the proposition should be shown, and farmers should be encouraged in every possible way to invest in ostriches. This has been recognised by the Government, and accordingly, at the request of the Natal Minister of Agriculture, the Government Agriculturist of the Cape Colony, Mr. R. W. Thornton, who is an expert in all matters connected with ostrich farming, visited Natal in July for the purpose of reporting upon the possibilities of the Colony generally in the

direction of ostrich farming and the suitability of certain lands in particular for this branch of farming. He inspected particularly a considerable area of land in the Weenen and Umvoti counties; and his report, framed as a result of his investigations, leaves no doubt as to his opinion of those portions of the country as ostrich-carrying lands. All the lands he inspected he found eminently suitable for ostrich farming; the only drawback of any kind at all appears to be that at Weenen the heat is likely to prove detrimental to the health of late or out-of-season chicks. This, however—which, indeed, only applies to Weenen, which is notoriously hot—cannot be regarded as a serious drawback, and it does not exist in portions of the Colony where the heat is not so oppressive in summer.

Mr. Thornton's report is of a more or less confidential nature, and its publication would not serve any useful purpose so far as the readers of this journal are concerned. Throughout, as we have said, Mr. Thornton gives expression to his favourable opinion of the possibilities of the districts he inspected—which included Weenen, Nkasini farm, the Tugela River Irrigation Works, and the Mooi River Irrigation Works. Better expression of opinion—so far as the general reader is concerned—he gave in the course of his lecture before the Durban and Coast Society of Industry, on the 28th of July, after he had completed his tour of inspection. An account of this lecture will be found elsewhere in the present issue of the *Journal*. It will be seen that Mr. Thornton considers the thorn country along the rivers in the districts he visited to be as good for ostrich farming as, and better than, almost any part he has seen in Cape Colony.

> There were a combination (said the lecturer) of conditions seldom met with except on a very small scale, at the Cape—that was land suitable for lucerne, a permanent water supply, and a suitable climate.

Mr. Thornton estimates that in the Tugela Valley alone some thousands of acres of land are suitable for ostriches, all of which land is capable of growing lucerne, and all of which can be put under irrigation. The financial side of the Colony's ostrich farming capabilities, as presented by Mr. Thornton in his lecture, cannot fail to prove attractive—and it will be seen that the position which Mr. Thornton described was not as bright as it would be in the case of an experienced man taking up ostrich farming in this Colony. Mr. Thornton gave a large amount of interesting and useful information regarding ostrich farming, and we commend the lecture to the perusal of our readers.

Thus for the present we leave the matter, but we shall have occasion to return to the subject later on; and we hope in the meantime to arrange for one or two interviews with gentlemen who are at the present time successfully farming ostriches, the results of which interviews will appear under "Traffics and Discoveries."

The Maize Congestion.

THE congestion in the maize traffic at the Point has constituted an important but unfortunate feature of the export trade this month, forming a leading topic of discussion in the daily press. The causes out of which this unfortunate state of affairs has arisen have been several, but two main factors stand out as of prime importance. These two factors are (1) the consignment to the Point of wet mealies by the farmers of the Orange River Colony and the Transvaal; and (2) the neglect of the Durban exporting merchants to comply with the request of the Shipping Conference lines to notify them of the tonnages due for export and the approximate dates on which it was desired to ship. Of these two factors, the former is perhaps of the greater importance as a cause of the state of congestion at present existing at the Point. From the point of view of the Natal farmer, at any rate, no terms are sufficiently strong in which to condemn the action of those of our northern neighbours who have been consigning damp mealies to the Point. To Natal is due the credit for the inception of the idea of exporting mealies upon systematic lines; our farmers have risen to their opportunities, they have thoroughly grasped the requirements of the market, they realise the fact that our mealies secure top prices, being considered the best in the market, and they are doing their utmost to sustain the good name which Natal maize has taken for itself. Now they have the spectacle of hundreds of tons of O.R.C. and Transvaal mealies arriving in Durban in a wet condition that renders them unfit for export until they are properly dried, and occupying shed accommodation that ought rightly to be available for good, dry stuff, and as a result of the congestion thus brought about our farmers cannot get their consignments on the water and are experiencing delays and difficulties which are irritating, to say the least of them. The Natal farmer realises as much as anyone the importance of Durban's retaining the premier position she has held right from the first as an exporting centre, but he justly fails to see why he should be penalised by the downright neglect of farmers in the inland Colonies who appear so ignorant of the primary essentials of an export trade in grain as to rail damp maize to Durban for export.

Much, however, as the failings of some of the farmers in the inland Colonies have had to do with the present state of congestion, some share of blame undoubtedly also attaches to the Durban merchants who are handling mealies for export. The Conference lines informed the shippers that they would be in a position to supply vessels if they would guarantee a certain tonnage. This the

merchants did not do, and the available shipping accommodation was accordingly far below requirements. At the last hour, almost, the merchants naturally requested the "ring" to allow them to ship by "outside" steamers if the Conference lines could not rise to the occasion. This for some time the Shipping Ring would not do—whether to teach the merchants a lesson or not it is impossible to say. The merchants would have learned their lesson in any case, however, and we cannot but censure the Ring for their action in delaying the concession asked for by the merchants. This delay meant further accumulation of stocks and further congestion generally.

The Government, as usual, has come in for a share of the blame, because there was insufficient truck accommodation. The Government, however, obtained assistance from the other Railway Administrations in order to cope with the increasing traffic, and at the same time cabled to England for further rolling stock for our lines. Whatever may have been the shortcomings of the Railway Department in the matter of truck accommodation, however, such shortcomings had nothing to do with the congestion at the Point, which was a matter of lack of shipping facilities combined with the impossibility of shipping damp grain.

Another factor which must be borne in mind in considering the causes of the maize congestion is that the great care which is exercised by the Government Grader at Durban in examining and classifying grain for export, combined, of course, with the excellence of the Natal mealie generally, has resulted in European buyers regarding with especial favour all maize shipped from Durban: shipment from Natal constitutes, as it were, a hall-mark of excellence. The result of this is that the O.R.C. and Transvaal farmers prefer to export through Durban, knowing that their grain, if it succeeds in passing the grader, will obtain top prices according to its grade; and the traffic as a result has been larger this year than ever, but the "block" at the Point has prevented things from going as smoothly as could have been desired.

Such, then, are the principal causes which have contributed to bring about the unfortunate state of things at the port during the present month. Fortunately, however, owing to the concession granted by the Conference Lines to the merchants, the congestion is, at the time of writing, becoming less severe, and it is hoped that matters will soon become normal once more. The chief persons concerned—the Durban merchants and the O.R.C. and Transvaal farmers—have learned a lesson, and there will probably not be a recurrence of this month's experience for a long time to come. The establishment of a clearing house by the Government, too, will go a long way towards preventing such a recurrence by arranging the shipments of grain and keeping the shipping companies informed well in advance as to the freight accommodation likely to be required.



Ramie.

THE cultivation of ramie in Natal is being hampered by the want of knowledge regarding satisfactory degumming processes and decorticating machinery. Announcements of new discoveries and new inventions are made from time to time, but thereafter little or nothing is heard of them; whether they prove satisfactory or not is not known: it is quite likely that the processes are kept secret and only a few individuals benefit, the operations being necessarily confined to a relatively small area of land; and in the meantime the world in general awaits the announcement of some discovery the "secret" of which will be placed within the reach of anyone who is sufficiently enthusiastic about ramie as to be prepared to spend a little money. Quite a simple degumming process is that lately elaborated by a Mr. Smith at Shanghai, the operation lasting only ten minutes; but in connection with this process, as with others, there is a "secret composition," which is added to boiling water in which the ramie stems are then placed and boiled for four and a half hours. We learn from a United States Consular Report, too, that a decorticating machine has also been invented by Mr. Smith, for which it is claimed that it will do the whole of the work now done in the field by hand with the exception of cutting and carting. It should be possible to get one of these decorticating machines, at least. So satisfactory, apparently, are the results that are being obtained that a fibre company has, we learn, been organised at Shanghai to manufacture ramie goods.

Grading Kafir Corn.

The General Manager of Railways announces that, in future, South African Kafir corn for export will be graded at the Port in the same manner as South African maize. ½d. per bag will be charged to cover this service. The grades are: Red, White, Black, and Mixed (F.A.Q.).

Experiment Station Notes.

Owing to the disastrous fire which took place at Cedara during the month, and pressure of work chiefly consequent thereon, the Director of the Division of Agriculture and Forestry has been unable to compile his usual notes on the work of the Experiment Stations. The main details of the work done during August will, however, be included in the September notes in our next issue.

Live Stock Insurance.

Some months ago we referred to an announcement which had been made that a live stock insurance association was about to be formed; and we gave at the same time some particulars regarding live stock insurance in Europe, the principles upon which European associations are run, and so on. Our readers will now be interested to hear that the association foreshadowed came into being some time ago under the name of "The South African Mutual Live-Stock Insurance Society, Ltd.," and has now begun issuing policies. This we learn from the July issue of the Bloemfontein *Farmers' Advocate*. We learn also from the same journal that, with the object of securing sufficient financial backing, the directors of the society approached one of the most powerful British Insurance Companies, *viz.*, the "Yorkshire," who for many years have been actively engaged in live stock insurance business in all parts of the world, and they were successful in getting the "Yorkshire" to interest themselves by becoming shareholders and subscribing for a considerable number of shares. These negotiations were completed in May of this year, with the result that the Society is now firmly established, and is doing a large and increasing business in all parts of the country.

The rates have been carefully worked out, and, contrary to expectations, are very little and in some cases no higher than European rates. The policies issued are of a most comprehensive nature, and the Society quotes rates for special risks, such as for foaling, castration, transit by rail and at shows, etc., and though at present the Society is confining itself as much as possible to the animals entered in the Stud Book, it is also accepting risks elsewhere. The majority of animals insured to date have consisted of mares in foal, stallions, bulls and cows. A few policies have been issued for high-class imported rams, but at present this class of business is not sought after, though at a later date the directors hope to be able to accept risks on practically all classes of well bred and cared for stock. The Bloemfontein Corporation has now insured a large number of its animals with the Society, and

several other municipalities throughout the country are making arrangements to do likewise. Mules are accepted at the same rates as horses, and as the majority of the smaller towns use mules for their transport they will be able to take advantage of the Society's terms. A pleasing feature of the Society's career is the support it is receiving from the farming community, and if the directors continue on the present sound lines they have already initiated, we prophesy a great future for the Society.

"Farmer Boys' Pages."

The present issue of the *Journal* witnesses the inauguration of another new and important feature: the FARMER BOYS' PAGES, according to the title we have selected. Abundant testimony is now forthcoming of the growing feeling in favour of education of the youth of the Colony in the science and practice of farming, in order to fit them more completely for the intensive scientific farming which is gradually but surely superseding the old style of farming by "rule-of-thumb" methods, and which must be embraced by every young or prospective farmer who wants to make his way in the farming world of the future. Progressive farmers are more and more coming to realise this growing necessity; and whereas not so long ago the idea of reading as a path to knowledge in matters agricultural was ridiculed, the modern feeling now is that study—*combined, it is true, as far as possible with practice*—is essential to shorten the road to success and to increase also the measure of that success.

A proper scientific training can, of course, only be obtained at such an institution as the Agricultural College at Cedara, or under the supervision of competent teachers. Much, however, can be learned by reading and correspondence; and the daily press of the Colony has helped to some extent to further theoretical and practical knowledge of farming by its practice of devoting (in two cases, daily) space to the discussion of subjects of direct interest to the Colony, whilst the *Natal Agricultural Journal* is, of course, published solely in the interests of the farming population, and serves to a considerable extent as an educational medium. Hitherto, however, in the daily press and in this *Journal*, the interests of those who are not farmers but who want to become farmers, of those who have just started "on the land," who want elementary knowledge, who wish to become acquainted with the principles of agriculture—or rather, we should say, of farming—who, in short, want to *understand* as well as to *know*, have not received as much consideration as they need. Elementary articles have been published, but without system, and the articles have only touched here and there upon the vast subject of farming.

There has been an undoubted want of a systematised publication of articles of educational value starting with first principles and proceeding by definite stages through the various branches of the sciences of the farm; it has long been our desire to endeavour to fulfil this want; and we are now able to announce that, from the present issue henceforth, we shall devote a number of pages monthly to the publication of really elementary articles written upon a systematised plan, and of notes and paragraphs of interest to boys and young men who want to obtain some grasp of the science of farming. We direct readers' attention to these FARMER BOYS' PAGES; from men of experience and teachers we invite suggestion as to the improvement of the PAGES: from the younger generation we invite suggestions as to subjects upon which they would like to have articles more particularly, and from them also we invite inquiries and correspondence generally connected with their study. It is our desire to make these FARMER BOYS' PAGES as helpful as possible to those who want to learn, and we shall spare no efforts towards the attainment of that end. In conclusion we would ask all those of our farming readers who have sons working with them, or who have apprentices on their farms, to call the boys' attention to these PAGES and recommend them to their perusal.

International Veterinary Congress.

We are informed by the General Secretary of the Ninth International Veterinary Congress, which is to be held at The Hague from the 13th to the 19th September next, that the preparation of the Congress is in full swing, and that more than eight hundred participants from all parts of the world have had themselves registered as members, whilst many official delegates have been appointed. The meetings of the Congress, as well as the opening and closing sessions, will be held at Scheveningen in the rooms of the Kurhaus and of the hotels of the "Exploitatie-Maatschappij Scheveningen." These rooms were already appointed for the purpose. On Monday, the 20th of September, the inauguration of the monument in honour of the late Dr. Thomassen, who died in 1906, will take place at the Veterinary School of the State in Utrecht. The excursionists will then go to the Northern Provinces of the Netherlands, where the most interesting towns and districts will be visited, and in some places cattle and horse shows will be organised for the members of the Congress. For those who wish to see another part of Holland, excursions to the Province of Zeeland are planned. A preliminary programme of the excursions is soon to be sent to the members. All particulars concerning the Congress will be communicated in a detailed circular which will be sent, in due time, to all the members, and which will likewise contain detailed descriptions of the towns and districts that are to be visited by the excursionists.

A New Patent Tin.

Manufacturers of fruit preserves, whether upon a commercial scale or in a small way on farms, will be interested to know that a new patent lever lid tin has just been placed on the market by Messrs. W. M. Mollison & Co., Ltd., of Anniesland, Glasgow, which is claimed to possess several advantages over the ordinary pattern of lever lid tin. The opening is the full size of the tin, whilst the top edge of the lid, instead of being left "raw," as in a slip lid tin or the present form of lever lid, is properly finished by "false wiring," leaving a smooth surface, which may be handled with perfect safety. As a result of the opening being the full circumference, there is naturally considerably less waste in using the tin, whilst the tin is more easily filled and emptied than is the case with the ordinary cans. The tin can furthermore be used when emptied as a mug, pan, or can, by affixing handles which are specially provided for the purpose by the makers of the tin. The tin (the patented name of which is the "Lan-ewen") can be closely "nested" for packing or export, as a 3-in. tin will go inside a 3¼-in. one, and so on; so that they can be shipped keeping the ton under 40 feet measurement. This is evidently a form of tin which has come to stay, and which is likely to supersede many older forms.

Importation of Fruit from Cape Colony.

Persons interested in the importation of fruit from Cape Colony into Natal will doubtless remember the prohibition which was made by Proclamation No. 58 of last year against the importation of apples, pears, and quinces from that Colony on account of the prevalence there of the insect pest known as the codling moth *(Carpocapsa pomonella)*. A further Proclamation (No. 57 of the present year) has now been issued amending the former order to the extent of withdrawing the prohibition in respect of certain districts of the Cape Colony which are now free from the pest referred to. Accordingly the provisions of Proclamation No. 58, 1908, will not henceforth apply to apples, pears, and quinces placed upon rail for Natal at any of the following stations on the Cape Government Railways, *viz.*:—*Sterkstroom to Maclear Line:* Maclear, Inxu, Ugie, Gatberg, Xuka Drift, Maxonge, Elliot, Navar, Crimoria, Xalanga, Ulin, Ella, Ida, Embokotwa, Zinga, Indwe, Umhlanga, Clark's, Dordrecht, Witte Hoogte, Koup's Leegte, Bird's River, Glen Wallace, Hasleton, Hazelmere, Penhock, Klein Schuur, Sterkstroom. *East London Line:* Putter's Kraal, Bombani, Bailey, Lesseyton Halt, Bowker's Park, Flower's Halt, Birch, Essex, Imvani, The Camp, Tylden Station, Tylden, Waku, Goshen, Cathcart, Gaika, Surbiton, Good Friday Krantz, Thomas River, Crow's Nest, Toise River, Littlego, Greytown Platform, Fairlie, Dolme, Stutterheim Road, Kabusie, Gazella,

Amabele Junction, Kei Road, Frankfort, Peelton, Blaney, Berlin, Lone Tree Loop, Fort Jackson, Egerton, Umdanzani, Amalinda, Cambridge, Chislehurst, East London. *Amabele—Butterworth Line:* Butterworth, Ndabakazi, Toleni Bridge, Eagle, Sihota, Spiral, Komgha, Prospect, Bleakmoor, Grays, Stockton, Ross Halt, Amabele. *King William's Town—Cookhouse Line:* Yellowwoods, Breidbach, King William's Town, King Halt, Leigeldt, Sekamos, Pirie, Debe Nek, Willmerton, Fort White, Middledrift, Ngwenya Halt, Redhill, Alice, Umdala, Fort Beaufort, Klu Klu, Kroomie, Adelaide, Primeston, Bedford, Request, Eastpoort. *Queenstown—Tarkastad Line:* Bowker's Park, Carl's Rust, Lehman's Drift, Waverley, Morning Sun, Tarkastad. *Grahamstown—Alicedale Line:* Grahamstown, West Hill, Coldspring, Atherstone, Highlands, Springvale, Alicedale. *Grahamstown—Kowie Railway:* Manley Flats, Blaauw Krantz, Martindale, Trapp's Valley, Clumber, Bathurst, Port Alfred.

Weights of Grain Bags.

Mr. P. J. Kroes writes to the Editor of the *Farmers' Advocate* as follows:—"Sir,—It is now laid down, that for the export of maize, bags must be used having a weight of 2½ lbs. each, the exporter otherwise running the risk of his shipment not being accepted at the coast. I consider it my duty to draw the attention of exporters to the fact that they may have to weigh each bag separately, because the manufacturers of bags are not keeping to a uniform weight as will appear from the following: I ordered a small quantity of 2½ lb. bags, and, whilst filling those bags, it struck me that the bags were very thin, and I decided to put them on the scale; I found that most of the bags weighed only from 2 lb. to 2 lb. and 1 oz. I returned the bags to the man I deal with and told him what I had discovered. He was immediately prepared to give me other bags, but before I accepted the new ones, I insisted that one out of the bale should be put on the scale. It appeared that this specimen weighed 2¾ lbs., and from the same bale I got my quantity. When filling these I noticed once more that the bags were not up to the mark, and consequently I returned them and decided to take a full bale of 300. The bale I bought was marked 2½ lb. bags, and I thought I had got over the difficulty, but my ultimate experience was the same as before. Of the 300 bags, 105 weighed between 2 and 2½ lbs. each. From the above it is quite clear that the manufacturers are very careless, and I hope that the disclosure of the above facts may put an end to it, in order that exporters may not suffer in future from such misrepresentations." It would be interesting to hear whether any Natal farmers have had similar experiences.

Mules from Argentina.

In order to alleviate the transport difficulties which farmers are experiencing as a result of East Coast Fever conditions in districts where the cattle have been decimated by this disease, the Government has imported a shipload of mules, numbering over 900, from the Argentine Republic, for sale to farmers. The mules were picked by Mr. James Piccione, and they appear to be a splendid consignment. The animals, after being examined by the Veterinary Department, are being sent up to two farms which the Government has hired for the purpose in the Camperdown Division, from where they will be issued to farmers. As announced in an official notice by the Under Secretary for Agriculture, the Department is now prepared to receive applications for these mules.

Hailstorm Insurance.

The question of the insurance of crops against the ravages of hailstorms has on several occasions been mooted in this Colony. The subject has been on the agenda paper of the Natal Agricultural Union; enquiries have at various times in the past been made of the Department of Agriculture by individuals regarding the feasibility of such a form of insurance; and the question has at various times been referred to by writers in the daily press. There are two ways in which the insurance of crops against hailstorm can be undertaken. One of these is by obtaining the financial backing of an ordinary insurance company. This method, however, is not worth considering in Natal for a long time to come—not until reliable statistics are forthcoming from which the frequency and extent of damage done by hailstorms in the various districts can be judged; for no insurance company will undertake the business until the risks are known. The alternative method—and, in our opinion, the only practicable scheme under present conditions—is that of co-operative insurance, each person paying in proportion to the value of his crops. This latter method we recommended in 1907, in our April issue (page 327). We suggested that at the end of each season payment could be made out of the funds in hand in proportion to the damage done by hail and in proportion to the funds in hand—the fund itself never being absolutely exhausted. We added that a guarantee to pay any definite proportion of damage done would probably render the association bankrupt the first season.

Whether or not it is that our suggestion made in 1907 has borne good fruit, we cannot, of course, say, but we are pleased to learn that a co-operative hailstorm insurance association has been formed in East Griqualand upon the lines which we recommended, the main idea of the

scheme being that payments in respect of losses sustained are only to be made to the extent to which funds admit—*pro rata,* of course. A description of the scheme has been furnished to his paper by the East Griqualand correspondent of the *Natal Mercury,* from which it appears that wheat, oats and barley cannot be insured for more than £2 10s. per acre; mealies, £1 10s.; other cereals, £2; and potatoes, £10; but the Society will accept no risk where damage to an insured crop is less than 10 per cent. Each member of the Society will pay an annual subscription of 10s., and the premium paid for insurance will be calculated on the following basis:—Wheat, 5 per cent. on the insured value of the crop; side and winter oats, 5 per cent.; Cape, Algerian, and Egyptian oats, 4 per cent.; barley, 4 per cent.; other cereals, 5 per cent.; mealies, 2 per cent.; and potatoes, 1 per cent. When a crop has been damaged by hail the insurer must report to the nearest assessor within 48 hours, and another 48 hours is given the assessor to make his report; but whatever compensation is given will not be paid until the end of the season, when the crop would have been reaped. Then, if the claims for damages exceed the funds of the Society, the claimants will be paid *pro rata,* after the working expenses have been met.

This plan of hail insurance we recommend to the attention of Natal farmers, who collectively suffer considerable loss every year through storms. It is the first practicable and feasible scheme ever adopted in South Africa; and it is just its practicability and simplicity, combined with the impossibility of bankruptcy, that must recommend it to groups of farmers who are desirous of instituting some scheme of insurance against the annual ravages of hailstorms. We hope to hear shortly that the idea has "caught on" in Natal also; at any rate we recommend it to the attention of farmers' associations, where the idea might be brought up at some of the monthly meetings.

Wattle Bark and the Tanning Industry.

We have received, through the Commercial Agent for Natal in London, a copy of the *Tanners' Year Book* for 1909, the organ of the United Tanners' Association of Great Britain and Ireland, compiled by Charles E. and J. Gordon Parker. The publication, of course, contains a large amount of technical information of no interest to readers of such a journal as this, but it also includes some statistics of interest to Natal wattle-growers, and there is also an article on "The Use of Mimosa Bark in Tanning Sole Leather," the conclusions of which have a special interest for Natalians. From the statistical tables we learn that the imports of mimosa bark from Australia into the United Kingdom (London) during the last seven years have been as follows:—

1902, 2,813 tons; 1903, 2,350 tons; 1904, 3,136 tons; 1905, 2,059 tons; 1906, 801 tons; 1907, 760 tons; 1908, 69 tons—from which it appears that we have little to fear in the future from Australia. This fact is more apparent when we examine the figures relating to imports from South Africa and study their magnitude as compared with the imports from Australia. The imports from South Africa, over the same period, have been as follows:—1902, 11,232 tons; 1903, 10,649 tons; 1904, 13,671 tons; 1905, 11,914 tons; 1906, 8,461 tons; 1907, 15,822 tons; 1908, 15,964 tons. The imports of valonia, gambier, and myrabolams last year amounted, respectively, to 5,266 tons, 829 tons, and 2,061 tons. It is interesting to note that, according to the table which is given of imports of tanning materials into Liverpool, the consumption of extract has not lately been on the increase. The imports during the seven years 1902—1908 have been as follows:—1902, 29,000 tons; 1903, 30,000 tons; 1904, 32,000 tons; 1905, 36,000 tons; 1906, 42,000 tons; 1907, 43,000 tons; 1908, 43,000 tons.

The *Year Book* also contains, as we have said, an article on "The Use of Mimosa Bark in Tanning Sole Leather," in which the author gives the results of careful experiments he has carried out with wattle bark (apparently principally Natal). A summary of these results should prove instructive to readers interested in wattle bark production, and we accordingly give the "general conclusions" which the author himself has drawn up. He says:—"The experiments as a whole seem to show that mimosa bark is an excellent tanning material for the sole leather tanner, but that it should always be blended with other materials for both economy and convenience. It is highly probable that a blend of mimosa and myrabolams would yield an excellent result. The myrabolams would introduce the mellow tan that is needed in all tannages; it would give some souring properties to the tan liquors, have a beneficial effect on the colour and the goods both in the early stages of tanning and in finishing, and would probably improve the weights and general quality of the leathers. ———

"Mimosa bark would seem to be beneficial even in moderate quantities in the ordinary mixed tannage, in freshening up too mellow liquors on account of its astringency, as a filtering material in the leaches on account of its non-production of bloom, and as a dusting material on account of the stability of its tannin and the readiness with which it spends. It would also seem that mimosa bark was a promising material for the extract manufacturer on account of the ease with which it spends. A blend of the readily soluble tannin with, say, five per cent. myrabolams, would probably make an excellent extract for strengthening the layer liquors, and it is possible that a profitable sulphited extract might be obtained from the difficultly soluble tannin."

O.R.C. Maize Competition.

With reference to the announcement appearing on page 707 of our June issue, Mr. C. McG. Johnston, the secretary of the Bloemfontein and O.R.C. Agricultural Society (Box 77, Bloemfontein), writes us as follows:—"With reference to the advertisement of mealie prizes which has been offered by this Society at the 1910 show, March 22nd-24th, which prize you so kindly inserted in your *Journal*, I have received a considerable amount of correspondence from Natal farmers. They raise the point that their 1910 mealie crop will not be ready to compete for this prize. Would you be good enough, therefore, through the medium of your *Journal* to draw their attention to the fact that we are prepared to accept entries and certificates of this year's crop, which they are now harvesting. In fact, that was the reason why we advertised this special prize so long before the show."

Fruit Drying.

A correspondent writes us as follows:—Twenty-nine thousand one hundred and forty pounds worth of dried fruit, exclusive of dates, were imported into South Africa during 1908. £29,140 could have been saved the country, as there is an abundance of fruit. Only a small percentage of the importation comes from Great Britain and the Colonies, the bulk of the remainder of £24,869 comes from the United States, and, considering that the fruit from that country comes from as far as California and has to be sent 3,000 miles by rail to New York and from there by steamer, it is astounding to find farmers in this country neglecting such a valuable industry. That good stuff can be produced with care and proper management has been fully demonstrated at the various agricultural shows during this year, the dried fruit exhibited being in no way inferior to the imported article, and these shows ought to influence the farmers to do likewise.

Many farmers complain that they do not know what to do with their surplus crops, as the prices obtained at the chief markets of South Africa are often unsatisfactory owing to the large quantity of fresh fruit coming forward, and apparently there is not sufficient demand. Other farmers complain that it does not pay them to send the fruit to the nearest market as the fruit gets too bruised over the bad roads, and they therefore prefer to let it rot on the ground, yet by drying it in a proper manner, they could turn this all into money and have a good return for their trouble and outlay. It is, of course, quite useless to think of success if the fruit is dried in the sun and simply bagged. Stuff of this kind finds no favour because fruit dried in this old-fashioned manner

has no tempting look about it, apart from the maggots, which soon make their appearance, as, during the sun-drying process, countless flies are attracted and deposit their eggs on the fruit. The bags, always more or less dirty, allow the dust to come in freely and the fibre sticks to the fruit, which is very objectionable. In the first instance the fruit has to be sorted, as no bad ones must be used, then fruit like apples, pears, quinces, etc., must be peeled by proper fruit-peelers, and if apple rings are to be made a combination parer is used, which peel, core, and slice the fruit, all at the same time. Apples darken almost immediately after being peeled, and this can be avoided by dropping the fruit into water in which a little salt has been dissolved. The packing must be done in a neat manner, paper-lined boxes of uniform sizes all containing equal weight must be used, and the contents and net weight must be stencilled thereon.

The drying must, of course, be done in evaporators, which require no particular skill and which can be attended to by farmers' wives and daughters, who only need from time to time to change the trays and refill them. Small evaporators with a drying surface of 8 and 10 square feet can be used on any ordinary cooking stove whilst cooking is going on. Such small evaporators are in use in nearly every farmhouse on the continent of Europe, whereas owners of large orchards invest in evaporators which have a drying surface of 20 to 60 square feet, with 12 to 20 interchangeable trays and mounted on specially constructed stoves, which may be used inside or out in the open. A large evaporator dries about 105 lbs. of apples in 12 hours, and uses, during that time, about 30 lbs. of coal, or an equivalent of wood, so that the cost of production is very small. The peels of oranges, citrons and pampelmus, after having been boiled in sugar and dried in an evaporator, are best known as "candied peel." Ordinary pumpkin treated in a similar manner is turned into a very palatable "konfyt." Watermelon konfyt is dried to perfection in such evaporators, as well as candied fruit of any description. Vegetable farmers, who get only a small return for their produce in the height of the season, can do better by drying their surplus. Dried vegetables, like French beans, peas, cauliflower, etc., will find a ready sale when nothing else but fresh cabbage is obtainable, and will be found to be an excellent addition to the otherwise monotony of the table, as they are nearly equal to the fresh article. These are soaked in water a couple of hours before boiling and then treated as the fresh vegetable. Herbs of any kind may also be dried, as also onions, tomatoes, potatoes, all of which are articles of enormous demand in other countries, and farmers will do well to pay attention to this.



THE JOHN DEERE STEAM PLOUGHING OUTFIT.—I.

Ten furrows cutting swath 11ft. 8in. wide; 2 and 3 acres per hour.

(See Article.)

The John Deere Company Steam Plough.

By LEONARD ACUTT, J.P., Tongaat.

MOST of us are now familiar with the working of steam ploughs, as there are several at work in Natal, some of them introduced by private enterprise, and two by the Government with the view of assisting the farmers in the (well nigh) crisis which has been reached by the loss of draught oxen by the Tick Fever. These steam ploughs are mostly those supplied by John Fowler & Co. and are worked by two engines, one on either side of the field to be ploughed, across which the ploughs are pulled by wire rope. The working of this type of plough was described by me in an article written for the *Journal* in May, 1908, entitled "A Visit to Vereeniging."

There are besides these Fowler ploughs some few small plants of traction ploughs, but the importation and working of a full-sized Deere Company's 10-furrow plough marks a new era in agricultural progress in Natal.

I accepted an invitation from Messrs. Morris Bros., of Empangeni, to witness, not a trial, for the machine has already ploughed over 100 acres, but a demonstration of what the plough can do under ordinary working conditions.

Messrs. Morris Bros. are mechanicians, and arrived in Natal with their father, Mr. George Morris, J.P., of Durban, in 1882. Mr. Morris, sen., was in the sheet metal line, his place of business being in what was then known as "Baxter's Passage," now School Lane. About 1906 the sons went into partnership with their father under the style or firm of George Morris & Sons, their place of business being in Williams' Road. The business included many branches, among which may be named electro-plating and the making of galvanised corrugated iron tanks for mealies and water.

The business was closed down in 1906, and the sons, Messrs. P. B. and G. H. Morris, who had always a leaning towards country life, took up, from the Government, the land which they are now working with their new importation.

The farms are Nos. 171 and 172, Zululand Coast Farms, and are situate close to Empangeni Railway Station, and have a long frontage to the Natal Government Railway. The farms are together in extent some 1,000 acres. The soil is apparently a deep red loam, carrying "insindi" grass.

The farms are outside of the line within which arrangements have

been made with Sir J. Liege Hulett to crush all sugar cane grown, and, therefore, until further factory power is provided, the farmers outside the line will have to look to other crops, and Messrs. Morris Brothers are devoting their attention to mealie-growing, and are preparing 250 acres for this season's planting, and intend very soon to have all their available land cultivated and be on the look out for "fresh fields and pastures new," as their steam plough will require a lot of land to keep it at work even half the year, and far more than the 1,000 acres or so which they now control. This neighbourhood is filling up rapidly. Mr. Frank Fynney and his son have taken up the adjoining farms to Messrs. Morris Bros., and Messrs. Andrews, Brookes and Logan, from Greenwood Park, are taking up their allotments, and work will probably be found for the plough on these lands when Messrs. Morris Bros. have done their own work, and we may expect to see a very large acreage of mealies growing in this district in a few months' time, the local demand for which staple is very great, and fair prices should be obtained without going to the cost of railway carriage.

The fondness of the Messrs. Morris for mechanics is evinced by the work they have put into their houses and other buildings, which are all most complete, and wherever the work of two willing pairs of hands could add finish to substantial work it has been put in.

The dwelling-house is most carefully fitted with wire gauze frames to doors and windows and all openings. The machine-shed is a large building, and contains a lot of machinery and tools, disc harrows, mealie planters and every machine calculated to save labour, and over all neatness and order reign.

Messrs. Morris Bros. have had the question of steam ploughing under their consideration for some years, and, from their reading, but mainly perhaps on advice received from a brother in Canada, where the Deere plough is largely used, they decided to import a plant from America.

The engine, which travels on the land, pulling the plough or ploughs, is a Reeves steam ploughing engine, double cylinder, 32-h.p. nominal, 96-h.p. indicated; width of driving wheels 3 feet, diameter 6 feet 2 inches. Working pressure 140 lbs. to square inch. Engine fitted with both injector and feed pump and super-heater. Boiler of ordinary locomotive type.

To the engine is attached a platform which is on three plate iron runners about 10 inches wide. In some of the plants now being made wheels are being fitted in place of the runners.

This platform carries a water tank and coal supply.

The coal used in a day's work is from 1,500 to 1,700 lbs.

The coal costs from 20s. to 24s. per ton at Empangeni.

Somkele coal was used at a cost of 13s. per ton, but none is now obtainable.

About 2,000 gallons of water is required per diem, and this is brought up from the well in a tank wagon drawn by ten donkeys; the water is drawn from the wagon tank to the tank on the platform by a steam syphon, and the taking in water causes very little delay.

To the platform above mentioned the ploughs, or "bottoms," as they are technically termed, are attached; these are 10 in number, in pairs, and are raised or lowered by the operation of five levers. The ploughs are not rigidly fixed to the platform, but are attached by a hinge arrangement, so that they are only kept in the ground by the hold they have of it, added to their own weight.

The ploughs have the high arched beam which we know as the "Cockshutt," but is called the John Deere big engine gang 10-bottom plough.

This arched beam enables the ploughs to go through foul land without becoming choked, the arched beam allowing the rubbish, grass, roots, etc., to clear. Each plough is fitted with a disc coulter; this coulter acts as a safeguard against stones or stumps, for in riding over such obstacles it lifts the plough out and drops it again when clear of the obstruction.

The levers operating the five pairs of ploughs are worked from the platform, and, on the outfit reaching the land to be ploughed, the levers are worked by a white man and a native and the ten ploughs take the ground practically at the same time.

The land which was being ploughed on the occasion of my visit was fairly level ground, the turf short, and, in fact, all the conditions were most favourable.

The depth of the cut was 5 or 6 inches, and this is quite deep enough for land which is to be planted this season. The width of cut is about 14 inches per plough.

After this ploughing the ground will be disc harrowed, and should then be ready for the mealie planters.

The machines turned over an acre in 19 minutes while I was on it, and this in spite of a very long turn at the headland and a stoppage to clear the ploughs of rubbish in going over where an ant-heap had been cleared; and, from two or three hours' observation of the outfit under working conditions, I came to the conclusion that, given that the land was properly prepared, a 10 hours' day should result in from 25 to 30 acres of land being turned over, or, if we put the average day's work at 20 acres, this should mean 100 acres per week. One day a week is always required for a thorough clean and overhaul.

The working expenses of this result would be per week:—

	£	s.	d.
Two white men, 15s. a day	9	0	0
One native, 1s. 6d. a day	0	9	0
One wagon and span for water	6	0	0
Five tons coal at 24s.	6	0	0
Oil, sundries, etc.	1	10	0
	£22	19	0

To which must be added wear and tear and upkeep, spares, etc., of plant. At any rate, the cost of ploughing 100 acres, which can be done in a week should not be heavy.

I quite realise that the plough was working under very favourable circumstances, and I should like to see it at work on land which had been cultivated. Still, when one bears in mind the usual firm condition of ordinary land after a crop of mealies has been taken off, one cannot suppose that the engine could not get a grip of such land, and if the engine can grip there is no fear but what the work will be done.

It will, of course, be understood that the ploughs are not reversible, but rigs have to be laid out and the sods "cast" or "gathered," as is done with ordinary ploughing with animal power.

A fairly wide headland is required, at least 60 feet. The engine is to all appearance as solidly built as English engines, but the ploughs have the regulation light American appearance, and there will doubtless be more fractures than with the English ploughs, but the parts are easily replaced in case of damage and at small cost, and we must, in looking at agricultural machinery from America, always remember that the leading idea with Americans with regard to vehicles and machinery is, that it is better to have a breakdown occasionally than haul about a large amount of dead weight.

The cost of the outfit landed at the Point is about £1,500, and the weight 27 tons.

I wish particularly to avoid any expression of opinion as to the comparative merits of one type of steam ploughing plant over another, but I may say that this "Deere" plough plant is quite unsuitable for the work now being done by "Fowler's" ploughs on the stiff soil and hilly country at Mount Edgecombe and Tongaat. For more undulating land, such as the Cato Ridge and Camperdown soils, the "Deere" outfit will do good work, and anyone going in for steam plough cultivation in undulating country should study this new importation, both as regards its suitability for the work, cost and working expenses.

This machine, though being of reasonable cost, is still not within

the reach of the average farmer, and a plant at half the cost, and with half the working expenses, would be a boon to South Africa, where animal life is so precarious.

Messrs. Morris Bros. are to be congratulated upon their enterprise; they have done a public service, and deserve the special consideration of the Land Department when they require more land, which, with this powerful machine to find work for, they will assuredly do before long.

The possibilities before the Empangeni district are enormous. I am informed by those who know this part of the country well, that all that great stretch of land up to, and behind, the Lower Umfolosi Magistracy, perhaps 25,000 acres in extent, is for the most part suitable for the growth of mealies and sugar cane, and let intending settlers be assured that they can get their first ploughing done at reasonable cost, which is in view with this plant in the neighbourhood, and the district should fill up rapidly and become a large mealie-producing centre, with the larger outlook in some years' time of planting sugar cane, when factory power is assured.

It is safe to say that, although Messrs. Morris Bros. have been late in getting their plant in working order, the result of their importation will be, that at least 1,000 acres of mealies will be planted this season, a very small part of which area could have been got in had the farmers relied upon animal power.

Intending mealie farmers should pay a visit to Empangeni to see for themselves.

Messrs. Morris Bros. will always be willing to show them the plant and the work it is doing, and besides the trip through the rich sugar-growing districts of Zululand is a pleasurable one, and, to those passing through for the first time, an object lesson.

Sitting down and waiting for something to turn up may be poor policy; however, that's how the hen gets her chicks.

The only way to gain a profit in any business is to pay strict attentention to the care of it. This applies more to poultry than to any other business.

Tea in Natal.

By "ANGLO-INDIAN."

TWELVE months in Natal tea, after nine years field and factory in Ceylon, has led the writer to believe that any comparative remarks as to its cultivation and manufacture would interest those concerned, and it is taken into consideration the limited supply of labour the Natal tea farmer has at his command. But, making all allowance for this, one ventures to think more could be made of the existing areas under tea both as to yield and quality: a far more important consideration, as Natal has not the sole monopoly of the South African tea trade even with the benefit of a fourpenny tea duty, which is not likely to be increased.

It is an undeniable fact Natal teas have a strong *growing* prejudice against them, which is being increased by the enterprising advertisements of foreign dealers. He is well aware that an average good Indian or Ceylon Pekoe or Pekoe Souchong tea can be bought wholesale in London or Colombo markets at from 6d. to 7d., which, in respect of quality and strength, certainly in flavour, is equal to, if not better, than Natal Golden Pekoe retailing at 1s. or 1s. 2d. It certainly goes farther. The liquor, though perhaps lighter in cup, is clear, pungent in flavour, and strong.

Natal growers have to compete with these, not by the cut-throat policy and sop of extravagant discounts, but by giving the public a better tea for the same money, which can be done by a more systematical system of plucking and pruning and the exercise of considerably more care in the various processes of manufacture. The imports of tea amount to 1,598,145 lbs., against a total Natal output of under 3,000,000 lbs., and yet the Natal producer has recourse to cutting his prices to secure buyers!

There is something wrong somewhere. Tea is not a crop like mealies to be hastily gathered and stored. On the contrary, from the day the tea comes into bearing till manufacture is finished, field and factory work demand most unremitting attention and the bush looked upon as a source of an indefinitely continued annual income, possibly an increasing one.

As manufacture may be of most interest, we will start with "withering." The bulk of Natal's tea crop is gathered in a few short months, and withering accommodation for this is nearly always insufficient. Nine square feet of space should be allowed for every pound of green leaf.

A good wither is absolutely essential to make a readily saleable article, and when leaf comes in fast, and is spread inches deep on the floor or racks, it does not "wither," but rots or discolours. Tea made from this, with every care in the subsequent processes, has a common taste, greenish mixed outturn, and other undesirable points possessed in common with a good many pure Natal teas.

In India and Ceylon, where accmomodation *used to be* insufficient and the importance of the above operation realised, open sheds were erected and fitted with jute hessian racks. The cost of such buildings with unsawn timber, roofed with iron or thatched is inconsiderable, and during any rush of leaf are utilised for surplus leaf. Naturally the wither is not so rapid as in a heated factory, but a natural wither is the best in ordinary circumstances, and makes good tea.

A word here as to racks. It is quite unnecessary expenditure for these to be made to roll up or tilt in order to remove leaf. Both methods have been thoroughly tried. They are ever getting out of order and sagging, which allows the leaf to collect and lie in heaps which remain partially unwithered, causing unevenness throughout manufacture. Light tapping under the jute rack with a 3-foot light rod made with a forward drawing movement will remove every leaf infinitely quicker than by aforesaid patent methods and is not so hard on the wear of the jute.

Well withered leaf is quite flaccid: a handful pressed adheres together, and the leaf is light green with the tips bright and silvery. Occasionally, owing to climatic conditions or other causes, the leaf threatens to *dry*. Should there be a probability of this the racks should be lapped under both edges towards the centre and the leaf thickened thereby. When spread on the floor this is impossible without undue handling of the leaf itself. This causes "reds" in made tea.

All glazed windows in withering lofts should be lightly whitewashed to prevent sunlight striking directly on the leaf, which also causes reds and spoils the flavour besides. Open sheds have their sides shaded with rough jute curtains to be let down when the leaf is spread.

Leaf if weighed after a good wither will be found to have decreased about 40 per cent. in weight, sometimes more. It should not be less.

Never allow coolies to tread or bruise leaf; this will give reds. Also do not have the withered leaf lying in heaps awaiting rolling. It will get heated and the flavour spoilt. If plucking is coarse, wither is bound to be uneven.

Rolling and Rollers.—Between the recent types with pressure gearing, Jackson's "Economic" and "Rapid," Brown's "Triple Action" (old type), there is little to choose, though with Brown's latest considerably

more pressure can be put on, but this necessarily requires a powerful motor.

With any, however, the full amount of its advertised capacity is never charged or any machine worked at a speed of over 40 to 45 revolutions per minute. Rollers worked faster than this do not roll; they *tear* the leaf into unrecognisable fragments, but detected by the expert by the presence of red "flake" mixed with red wiry stalks (the mid-rib of the coarser leaf) in the fine made tea, and the infusion is characterised as very mixed.

Well-withered leaf gradually acquires a twist during the first roll at a speed of 40 to 45 revolutions per minute; over this spread the tip and fine leaf will get spoilt, broken up into dust and lose flavour by mixing with the juices of coarser leaf; it is a hash up in fact, and should *never* be attempted at either high or medium elevations, however fine the flavour of the particular estates' tea may be. One such shipment would mean the loss of their usual buyer.

The objects of rolling are: By the first and second rolls to separate the fine tip and leaf from the hard stalks and coarser leaves in order that when the whole is passed through the roll breaker and sorter the fine will separate for treatment during fermentation, firing, and sorting. If carefully rolled the bigger leaf does not separate from the coarser fibres, but twists and consideraby modifies the number of "reds" in the finer grades.

For the second roll only what may be called half pressure should be put on, and that even lifted two to three minutes in every ten to admit as much cool air as possible, preventing undue heating and consequent loss of flavour.

The third or subsequent roll (roller accommodation permitting) when full pressure is put on (with the same precaution) is to bruise the cells of the larger leaf as much as possible, thus rendering their contents readily soluble when infused.

The usual periods of the three rolls are: First, 25 to 30 minutes; second, 30 minutes; third, 30 to 35 and even 40 minutes. Some estates give the big leaf even a fourth of 25 minutes prior to rolling to take up any twist it may have lost while lying fermenting.

Before proceeding further, it would be well to still opposition to what will certainly be called unduly prolonged rolling by tea-makers in Natal, by pointing out that the aforementioned objects cannot possibly be performed in one operation, and also that if the rolling be properly carried out, *i.e.*, slowly and with attention to the pressure gear, no loss of flavour need be feared. Estates where the highest priced tea comes at elevations of 3,500 to 6,000 feet regularly pursue this system in a climate similar to Natal, and yearly show a market average from 9d. to



THE JOHN DEERE STEAM PLOUGHING OUTFIT.—II.

The Engine.

(See Article.)

11d. per lb. all grades in. It has another undoubted advantage: Well-rolled leaf is easier to sort into the respective grades with the least use of the cutter or equaliser. The best of these greys the leaf. Good rolling twists the leaf in its wet state, thus preserving the bloom and minimising the percentage of dust produced.

Possibly there are advocates of the one roll and almost immediate firing. To these it may be asked: What percentage of the lower grades, *i.e.*, Pekoe Souchong and Souchong do they produce, and its highest valuation?

In the first place this tea is not a true black tea, but may be classed by the trade as Oolongs, and poor at that. The existing flavour with Natal plucking does not warrant this treatment, and, secondly, they do not meet the popular demand for a full flavoured liquor or go as far as the imported article prepared on lines similar to above, *carefully* prepared and sorted and sold for less on the London market. Should there be a sufficient local demand for this class of tea it might be an experiment worth trying for estates with insufficient withering or rolling power to produce a *bona fide* Green Tea with part of their crop. A boiler and steamer would be the only machine necessary in addition to their existing machinery, and during a heavy rush surplus leaf might be made into Greens, and perhaps sell better than improperly manufactured black tea. This is done by some well-known growers in the East for the American market.

Roll Breaking and Sorting.—This machine and its work requires every attention. It should not only break up lumps of lear but completely sift the *fine leaf only* from the bulk as taken from the roller. Often too much bold leaf is abstracted, and, needless to point out, this has not received sufficient treatment in the roller if it comes through after the first roll only. It will show greenish in infusion, besides weakening the liquor, its cells having been left intact. The circular revolving roll breaker is little used now. Brown's, Walker's, etc., all with the horizontal motion and revolving paddles in receiving box do the work well and quickly, and are fitted with No. 4 size mesh, the slope of which can be altered to suit requirements.

After every period of rolling, leaf is put through as quickly as possible, and the fine siftings of first, second and third rollings put apart to ferment and fire separately.

The breaking up in roll breaker materially assists in keeping leaf cool.

Fermentation.—Messrs. Mann and Kelway Bamber, scientists appointed by the Government of India and Ceylon, have made deep researches as to the actual changes that occur during this period, and their works on the subject may be obtained; but for practical purposes—the

wither and rolling having been satisfactory—the leaf is spread on the trays or floor in the fermenting room set apart for the purpose in the coolest part of the factory, and not more than four inches thick. Cover with a damp cloth; the fine leaf sorted to be kept separate from the big bulk, as it reaches the correct stage for firing sooner.

The ideal ferment shows this of a very fairly even bright yellowish brown, which will develop when placed in the drier into the darker "coppery" outturn so much desired by tasters. No fixed time can be laid down for fermentation. The right stage is better arrived at by sight, smell and experience. Some days leaf will never colour nicely, getting dark or remaining greenish. It is better to start firing such leaf about 2 to 2½ hours after rolling, counting from the time it is first put in the roller. The firing of the big bulk may be proceeded with immediately this is finished. Large leaf never or seldom colours evenly, also leaf from fields which have run long from pruning and small leaf *Jat* (kind) of tea bush. The indigenous large-leaved kinds as Manipur and Assam varieties always give best outturns, more pungent and strong liquors with a maximum of tip besides, being easier to make good tea of in every way.

One caution Messrs. Bamber and Mann are unanimous about: The cleanliness of all machinery. Roller, breaker and fermenting cloths should be washed every day. In some factories a mild solution of permangate is used. Fermenting cloths especially quickly get tainted and spoil tea, and it would be better without them than dirty. To ensure perfectly cleanliness one or two factories in the East have gone to the extent of using glass or marble ferment shelves, but polished cement well looked after is expensive enough and efficient.

A free current of cool air should be allowed to play over fermenting leaf, and a light, damp blind over windows is used on close days, sometimes arranged so that a continuous drip of water falls on them and a cool, even temperature not above 70 degs. Fahr. maintained, the cooler the better.

Firing.—Drying the fermented roller leaf is an operation for which constant supervision is imperative. The latest machines for the purpose have been designed with a view to rendering the process practically automatic, but none are really so when entrusted to the care of the Indian labourer with his ideas of time and temperature.

The latest machines have an arrangement of flues by which the leaf is, when put in, subjected to an initial temperature of about 220 degs. to 230 degs., which instantly checks fermentation, and slowly finishes at 180 degs. to 190 degs., a much-to-be-desired system as this lessens the chance of overfiring. In this connection a caution may be impressed upon Natal tea-makers. Most of the earlier driers have furnaces more

or less designed for wood fires, which are much slower than the coal used locally, and this fact seems to be overlooked, judging by the frequency one tastes overfired, brisk or burnt tea. With old machines, where no provision is made for temperature, this should never exceed 190 degs. to be on the safe side. The large automatic endless tray arrangements like the Paragon do not seem suitable for fine leaf, and firing is mostly done by the smaller machines, as the "Sirocco," "Venetian," and "Desiccator," as small leaf even with every care gets frequently overfired in the big machine.

With all types a measuring box containing a fixed (approximate) quantity of green leaf for the respective machines should be used and the coolies kept from heaping up and "stewing" the leaf under a mistaken idea they are hastening through the work. Leaf thickly spread loses all "point" and pungency, while the topmost leaves and the lowest get overfired and taint the rest.

Fine leaf should be fired first and separately from big bulk. Mixed, it may be assured that fine tea will be burnt by the time coarser leaf is "done," or this leaf will be taken out only partially fired when the fine is ready. Fermentation consequently continues and leads to musty and mildewed tea if occasion causes it to be kept for some time in bins. In the East teas are never kept in store over one month and are always fresh. Charcoal firing undoubtedly tends to preserve the flavour of tea, and, some well known men maintain, even causes it to improve by keeping; certainly no machine-made teas can come up to the old primitive "chula" or charcoal oven-fired teas, though efforts have been made with present-day machines to introduce sufficient carbonic acid gas fumes to preserve quality by means of charcoal burning braziers placed at the draught inlet, but the drawing power of the fans is so great that the amount was practically ineffective. A new machine burning coke or charcoal has, however, been introduced and meets with excellent reports from users, and prices show improvement.

Well-fired tea is best judged by the feel, and, of course, overfired tea is at once detected by smell when the furnaces are lowered immediately and all doors opened. The feel should just be crisp with a very slight spring in whole leaf. Coarse stalks cannot be fired with tea. These might with advantage be eliminated by the pluckers. Very quickly dried tea loses the fine shade of gold in the tip, and is nearly always brisk. Tea for dispatch should always be re-fired. This is generally done at about 180 degs. and packed just warm. Re-firing is always done no matter how recently the tea was made.

Sorting.—The machine generally in use on up-country estates with the smallest pretensions to possess flavour is the horizontal motion sifter, fitted with Nos. 24 or 30 to remove dust. No. 12 for Broken

Pekoe (or Golden Pekoe, as this grade is known in Natal), No. 8 for Pekoe, 6 for Pekoe Souchong. The sorting should be done the day after manufacture to allow the leaf to cool and get crisp.

Natal growers have their own particular buyers to accommodate and the sifting has to be done to suit requirements, but the percentages with good plucking work out in Ceylon and India, with above-named sieves, Broken Pekoe about 30 per cent., Pekoe Souchong 20 to 25 per cent., Souchong about 15 per cent. Tea when sorted is never allowed to lie about but immediately stored in air-tight zinc bins. If left open tea is quickly affected by moisture, which it readily absorbs and loses its keeping qualities and flavour. No re-firing will remedy this. It may be well to mention that an undue proportion of Broken Pekoe is never attempted. It is artificial and apparent in the greyness of the sorted tea, being choppy and mixed in outturn.

The high priced Indian and Ceylon Broken Orange Pekoes cannot be attempted with the general plucking of the poor average quality of the small leaved *jat*. It has been found the greatest of mistakes in the earlier days of planting to put out inferior cheap seed or seed plucked from tea in production whatever may have been the original kind, Assam or Manipur. The seed gets deteriorated by hybridisation and other causes. Not only is the yield slow and of inferior quality with little tip and hard leaf, but the bushes take longer to come into bearing. With a good *jat*, flush comes on quicker by several days, and the plucking and pruning more easily done (there being little undergrowth), with clean stems which run for sometimes over three years without pruning. Owing to climatic conditions and insufficient rainfall a very high *jat* light-leaved variety could not be recommended for Natal, but a really good hybrid seed can be obtained for about £5 per maund (80 lbs.). The expenditure is more than justified by subsequent results in every way as the bushes answer quickly to cultivation and not produce an annual crop of seed and blossom which one learns with regret is used sometimes to plant fresh acres. Cases are known where proprietors have cut out old "China" tea and replanted and are satisfied; it has paid them. Not one would contemplate planting from seed taken from bushes in bearing. If an estate does plant from its own tea a portion of the estate widely planted is kept for the purpose and allowed to grow into trees from which the seed is taken, and these trees are grown from imported seed from India.

Much more can be said as to the comparative methods of field work, plucking and pruning, but space forbids, though this is as important in the production of a first-class tea as manufacture only. Many planters aver that tea is *made in the field* and there is as much difference in Natal methods of cultivation as in manufacture, more especially as regards pruning and plucking.

Orchard Culture.

TILLAGE *versus* SOD MULCH IN THE APPLE ORCHARD.

WHICH IS THE BETTER SYSTEM?

The question as to whether the apple thrives better under tillage or in sod has long been a subject of controversy among apple-growers and orchard experts generally in all parts of the world. What are the comparative effects of tillage and sod on the apple tree? Each system has its advocates, but is there any material difference between the results obtained from orchards under tillage and in sod respectively such as would warrant advocacy of either system? And if there is any difference, which system has the balance of results in its favour?

This is not the first occasion on which we have referred to this interesting question. In our issue of January, 1908 (page 53), we published an article in which we gave the results of experiments conducted by the Ohio Agricultural Experiment Station, having for their object the elucidation of this same problem of apple orchard culture. From these experiments the inference was to be drawn that the apple thrives better under a sod and mulch method of management than under tillage and cover crops. The Bulletin from which we drew our account of the experiments, however, omitted to refer to so many important details of the method of conducting the experiments that, although the conclusions drawn may have been applicable to the Ohio Station orchard, it will be difficult to make proper application of them to many other conditions. The experiments, however, yielded some interesting results, and their publication in the pages of this *Journal* was, we venture to hope, found useful by apple-growers in Natal.

Another important experiment, or rather a series of experiments, to which reference should be made are those conducted by the Woburn Fruit Farm. At the Woburn Experimental Fruit Farm, Ridgemont, England, experiments with trees in sod and under tillage have been carried on for the past thirteen years, and have been reported upon from time to time by the experimenters. The Third Report of the Woburn Farm is a treatise on "The Effect of Grass on the Apple Tree," in which the methods employed, the results obtained, and the causes of the effects of grass on trees are very fully discussed. The conclusions of the Woburn Farm investigations as to effects are as follows:—

"As to the general effect produced by grass on young apple trees, the results of the last few years have brought forward nothing which can in any way modify our previous conclusions as to the intensely

deleterious nature of this effect, and we can only repeat, that no ordinary form of ill-treatment—including even the combination of bad planting, growth of weeds, and total neglect—is so harmful to the trees as growing grass round them; indeed, the 'neglected' trees in plot 44, which up to 1900 showed only a slight advantage over the grass-grown trees, are now decidedly superior to them, both in size and vigour, whilst in the similarly 'neglected' plots of standards the trees are but less vigorous than the normal ones."

The authors state that their investigation leads them to believe that water supply, food supply, and air supply are not the principal causes of the deleterious effects of the grass on the trees. Soil temperature is discussed and dismissed as not being a prime factor. The chief hypothesis set forth in this report as to the cause of the evil effect of grass on the apple is that toxin is excreted by the grass roots. The statement in this regard is as follows: "Direct experiments seem to negative the possibility of explaining the action of grass on apple trees in the various ways which we have discussed above, water, food, and air supply, and lead us to a conclusion, which has also gradually been forced upon us by the appearance itself of the trees throughout the years that they have been under observation, namely, that this action of grass is not merely a question of starvation in any form, nor of any simple modification of the ordinary conditions under which a tree can thrive, but that the grass has some actively malignant effect on the tree, some action on it akin to that of direct poisoning."

Here we have a definite opinion, formulated as a result of thirteen years' experimenting, that the practice of growing grass around apple trees is attended with harmful effects.

The latest experiment of importance of which results have been published is one which was begun under the auspices of the New York Agricultural Experiment Station in 1903 in the orchard of Mr. W. D. Auchter, near Rottcher, New York. Such interesting results have been obtained that we propose to give some account of the experiment for the benefit of our readers. A preliminary report on the experiment has just been issued by the New York Station in the form of Bulletin No. 314 from the pen of Mr. N. P. Hendrick. Two sets of experiments are in reality being conducted, one on Mr. Auchter's farm and the other on the farm of Mr. Grant Hitchings, but work in the latter orchard has not been carried far enough to warrant a formal presentation of results. We may add that the investigations are to continue for five years to come.

The Auchter orchard consists of a little over 9½ acres of Baldwin trees set in 1887 at a distance apart of 40 feet each way. There are ten rows in the orchard, each containing 26 trees. Rows 1 to 5, inclusive, are under sod-mulch treatment, and rows 6 to 10 are tilled.

A few trees in each plot are not in the experiment; the number of trees in the sod plot actually in the experiment is 118, in the tilled plot 121. Previous to this experiment the trees had been under tillage with an annual cover crop. Variations in soil are few and slight.

MANAGEMENT OF PLOTS.

The trees in the two plats of the experiment have received as nearly as possible identical care as to spraying, pruning, and all other orchard operations excepting soil treatment. The soil in the two plots has been managed as follows:—

Sod Plot.—October 15, 1903, eight quarts each of orchard grass and blue grass seed were sown per acre, from which a fairly good stand was secured. To make sure, however, of a good stand of grass, a second seeding of sixteen quarts of blue grass, eight quarts of orchard grass, and three quarts of timothy seed was made April 21, 1904. During the first season the grass flora was well divided between the above three grasses, but the second year the orchard grass became dominant, and has increased in quantity, until now the plot is covered with an orchard grass sod. The grass has been mowed on the following dates during the five years of the experiment:—

1904.—June 21 and August 23.
1905.—June 12 and August 14.
1906.—June 18.
1907.—June 27.
1908.—May 27 and July 4.

The grass, if allowed to stand until haying time, would produce two tons per acre and when cut twice the crop would exceed this amount. The character of the grass growth is shown in Plate II. It was in all cases allowed to remain where it fell from the mower as the roots of the trees spread over the entire orchard area and there was therefore need to mulch the whole area.

Tilled Plot.—The following is a memorandum of the treatment of the tilled plot:—

1904.—Plot ploughed June 7-11; ground harrowed June 13, June 20, July 19, July 29. Cover crop of mammoth clover sown July 30 and the seed harrowed in with a weeder.

1905.—Plot ploughed May 30; rolled June 5; harrowed June 13, June 26, July 7, July 22, August 2. Mammoth clover sown August 3 and the seed covered with a weeder, followed by a roller.

1906.—Plot ploughed June 4-6; rolled and harrowed June 7; harrowed June 22, July 20, August 2. A cover crop of oats was sown August 2 and harrowed in the next day.

1907.—Plot ploughed May 27-29; land harrowed May 31, June 28,

July 17, July 27, August 5. A cover crop of mammoth clover was sown August 6 and covered with a weeder.

1908.—Plot ploughed May 23-26; land harrowed May 27, June 4, 12, 23, and July 31. A cover crop of oats was sown July 31 and harrowed in the following day with a weeder.

Fertilisers Used.—At the time this experiment was begun there were few data to show what food constituents the orchard lands of the State need. It was commonly thought that the apple lands of western New York need phosphoric acid and potash, and that the land of which that in the Auchter orchard is a type needs the former in particular. For the first three years of the experiment, therefore, 400 pounds of acid phosphate were used in the orchard, and cross rows 8 and 9, running through the tilled and sod plots, were fertilised with muriate of potash at the rate of 400 pounds per acre. It could not be found that trees or cover crops were any the better for the application of potash in these two rows, and it seemed from other data coming in that the phosphoric acid was being wasted as well. The fourth season, 1907, the general application of acid phosphate for the whole orchard was dropped, but the muriate of potash was continued on cross rows 8 and 9; and the phosphate was applied on cross rows 12 and 13 at the rate of 15 pounds per tree; on cross rows 16 and 17 the two fertilisers were combined in the quantities given above. During the season of 1907 no effects could be observed on apples, cover crops, or grass. It is fair to include, therefore, that the additions of these two food constituents were not needed in this orchard, and their use was discontinued in 1908. None of the plots to which fertilisers had been applied in past years showed any effects in 1908.

RESULTS OF THE EXPERIMENT.

The relative merits of the two treatments have been gauged by all important characters of fruit and tree. The following is a summary of the results of the experiment:—

The average yield on the sod plot for the five years was 72·9 barrels per acre; for the tilled plot, 109·2 barrels; difference in favour of tilled plot, 36·3 barrels. Estimates made at blooming and fruiting time showed a far greater number of fruits on the tilled trees. Actual count showed 434 apples per barrel on the tilled land weighing 5·01 ounces each and 309 apples per barrel on the sod land weighing 7·04 ounces each. The fruit from the sod-mulch plot was much more highly coloured than that from the tilled plot. The fruit on the sod-mulch plot matures from one to three weeks earlier than that on the tilled plot.

In common storage, fruit from the tilled plot keeps four weeks longer than that from the sod plot. In cold storage, the keeping quality of the two fruits is the same.



THE JOHN DEERE STEAM PLOUGHING OUTFIT.—III.

General View of the Engine and Ploughs.

(See Article. [1]

The tilled fruit is decidedly better in quality, being crisper, more juicy and of better flavour.

The advantage of tillage over the sod-mulch in the matter of uniformity of trees and crops is marked. The trees in sod showed abnormalities in foliage, branches, roots, and particularly in fruit-bearing and in fruit characters. The average gain in diameter of trunk for the trees in sod for the five years was 1·1 inch; for the trees under tillage 2·1 inches; gain in favour of tillage, 1 inch The dark, rich green colour of the foliage of the tilled trees indicated that the tilled trees were in the best of health. On the other hand the yellow colour of the leaves of the sod trees told at once that something was amiss. It needed only a glance in the orchard to see the leaves of the tilled trees were much larger and much more numerous, and that therefore the total leaf areas were much greater. Leaves from sodded trees and the same number (2,400) from tilled trees weighed and gave 8·7 grams as the average weight per leaf for the sodded trees and 11·5 grams for the tilled trees. The leaves of the tilled trees came out three or four days earlier and remained on the trees a week or ten days later than on the sodded trees. The average annual growth of branches for the sodded trees was 1·9 inch; for the tilled trees 4·4 inches. The average number of latrals per branch on the sodded trees was 3·4; on the tilled trees 6·7.

During the dormant season there was a striking difference in the appearance of the new wood in the two plots. The new wood on the tilled trees was plumper and brighter in colour, indicating better health. The amount of dead wood in the sod-mulch trees was much greater than in the tilled trees.

The roots of the trees in the sod-mulch plot came to the very surface of the ground. How much these trees suffered by the destruction of roots in the heat and drought of summer or the cold of winter cannot be said. In the tilled land the roots were found in greatest abundance at a depth of from three to ten inches. The circumference of root systems in the tilled trees is approximately circular, but the circumference of the roots of the trees in sod is very irregular, indicating a reaching out of a part of the roots in response to a demand for more moisture, food, or air to escape some evil effect of the grass roots. A fair way of comparing the quantity of the living roots of the trees in the two plots could not be found. The trees in the outside rows of the sod plot, where the roots could penetrate into the tilled land, without exception showed better health and greater productivity than the trees in the inner rows.

The average cost per acre for the two methods of management, not including harvesting, was 17·92 dollars (£3 14s. 8d.) for the sod;

and 24·47 dollars (£5 1s. 11½d.) for tillage, giving a difference of 6·55 dollars (£1 7s. 3½d.) in favour of the sod. The average net income per acre for the sod plot was 71·52 dollars (£14 18s.); for the tilled plot 110·43 dollars (£23 0s. 1½d.), a difference of 38·91 dollars (£8 2s. 1½d.) in favour of tillage, an increase of 34 per cent. for tillage over the sod-mulch method of management.

Tillage seems to be better than sod for the apple for the following reasons:—

The results of 120 moisture determinations in the Auchter orchard show that the differences in tree growth and crop in the two plots of this experiment are mainly due to differences in moisture, the tilled plot having most moisture. As a consequence of the reduced water supply in the sod plot, there is a reduced food supply; for it is only through the medium of free water that plants can take in food. Analysis show that the differences between the actual amounts of plant food in the two plots are very small.

Analyses show that there is more humus in the tilled plot than in the sod plot, contradicting the oft-made assertion that the tillage method of managing an orchard "burns out the humus."

At a depth of six inches, the tilled soil is 1·1 degree warmer in the morning and 1·7 degree at night, than the sod land; at twelve inches the soil is 2·3 degrees warmer in the morning and 1·8 degree in the evening.

"We are justified, without the presentation of specific data, in saying that a tilled soil is better aerated than sodded land."

Soil investigators are well agreed that beneficial micro-organisms are found in greater numbers in a cultivated soil than in others.

APPLICATION OF RESULTS.

In concluding, the following paragraphs from the *Bulletin* will, we think, be found of practical value by apple-growers in this Colony:

The well-being of nearly all the plants which minister to the needs of man is improved by tillage. It does not appear from this experiment that the apple is an exception. This fruit responds to high cultivation in the nursery row; it seems to continue to do so when transplanted to the orchard. Results as positive as in the experiment can be made very comprehensive. They will, it is believed, apply to all varieties of apples, and to all fruits, for that matter, and to practically all fruit soils and conditions. It should not be expected, however, that sod will be deleterious in the same degree under all conditions. It should be expected, for instance, that in a deep soil, where the apple roots can escape from the grass roots, or in one containing a great amount of soil moisture, the harmful effects of the grass will not be

so marked as otherwise. The experiment does not show that apples cannot be grown in sod. There are many orchards in New York which would prove the contrary. It suggests, however, that apples thrive in sod, not because of the sod, but in spite of it. The fact that there are many thrifty orchards in sod in New York is not proof that these orchards would not do better under tillage.

In considering the two methods of management, of all the factors effecting the growth of trees in this experiment, conservation of moisture should receive first attention from the apple grower. The statement is affirmed not only by the results in the Auchter orchard but in practice the world over. The climate of Europe is moist; soil orchards are the rule there. Near the Atlantic seaboard in America, as in New England, where the rainfall is comparatively high, thrifty orchards are found in sod. In the western fruit regions where irrigation is practised, sod orchards are hardly to be found; water is purchased and must be conserved. In irrigated lands tillage is found to be the best means of moisture conservation. Moisture is by no means the only factor to be considered in the controversy over the sod and tillage methods of management, but it appears to be the chief one.

The statement is often made that trees will become "adapted" to grass. There is nothing in this experiment to indicate that this is the case. The sodded trees began to show ill-effects the first year the orchard was laid down to grass, and each succeeding year has seen greater injury. Trees can hardly become adapted to thirst, starvation, asphyxiation and poison.

To manage the soil of an orchard properly requires nice adjustments and delicate balancing for each particular case. Soils vary much and all are complex; quite diverse chemical, physical and biological changes take place in diverse soils. Every apple-grower, therefore, has a problem of his own. But the individual problem can be best solved by the rational application of the ordinary laws of nutrition and growth—those which apply to cultivated plants in general. The apple is not unique among plants.

The largest eggs are produced by steady layers.

A cross hen—that is, one that will peck at you if you reach toward her while on the nest—generally makes the best sitter.

Onion Culture.

By W. R. BEATTIE,
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THE essential requirements of a soil upon which to grow onions profitably are a high state of fertility, good mechanical condition in order that the crop may be easily worked, sufficient drainage, and freedom from weeds. If a soil has the proper mechanical properties—that is, if it contains sufficient sand and humus to be easily worked, is retentive of moisture and fertilisers, and is capable of drainage—all other requirements can be met. At least three types of soil are being extensively planted to onions in this country, the one common essential being proper mechanical condition.

CULTURAL METHODS.

The onion belongs to that class of crops which gives best results under very intensive culture, and the greatest yields are secured where a moderate acreage is planted and the work conducted in a most thorough manner. There is nothing technical or difficult about the growing of onions, but close attention and frequent cultivation are essential. Once the weeds get a start, the cost of production will be greatly increased, or the crop may be lost altogether.

PREPARATION OF NEW LAND.

As a general rule new land is not adapted to onion growing until it has been worked one or two years with other crops. Onions should follow some crop that has been kept under the hoe and free from weed the previous season. Mealies, beans, and potatoes are suitable crops with which to precede onions. Muck and sandy soils may in some cases be brought to a suitable condition for onions the first season, but the fitting will have to be very thoroughly performed. The land should be ploughed in the autumn, then re-ploughed in the spring, after which numerous harrowings and doubtless some hard work will be required to get the soil in suitable shape.

If necessary to manure the land heavily before planting to onions, it will be desirable to plant some farm crop one season, then apply the manure during the autumn in order to give it time to become incorporated with the soil. Owing to the value of good onion land it would not be advisable to devote it to general farm crops for any ex-

* Abridged from Farmers' Bulletin No. 354 of the United States Department of Agriculture.

tended period, although the maize is frequently planted and oats or rye are sometimes used in the North. Cowpeas may be of great service in bringing new land into shape for planting to onions.

CROP ROTATION.

Onions should not be planted on the same piece of land year after year, and some system of crop rotation should be maintained. Care should be taken, however, to use crops in the rotation that will not be exhaustive of the high fertility necessary in the onion land. During the years when the land is not devoted to onions it can be planted to some truck crop that will give a return that will justify the application of large quantities of fertilisers, or, better, to a leguminous crop to be turned under as green manure. Continuous cropping with onions will cause the land to become infested with both disease and insect enemies that will sooner or later injure the crop to such an extent as to render it unprofitable.

PREPARATION OF THE SOIL.

Assuming that the land intended for planting to onions is capable of being brought to a good mechanical condition, fertile, well drained, and reasonably free from weed seeds, the first step in the production of the crop will be to plough moderately deep, then harrow, disc, roll, and drag until the soil is smooth and mellow to a depth of 4 or 5 inches. The method of preparing the soil will depend somewhat upon its character, the manner of planting to be followed, and the requirements for irrigation. There are few truck or other crops that require so careful fitting of the soil as do onions, and it is essential that the fertilisers be well mixed with the soil.

On soils that are naturally well drained and where surface water can not accumulate, the ploughing may be done in large blocks, but where the opposite conditions are found or irrigation is practised it may be necessary to plough the land in narrow beds. In the case of insufficient drainage it will be desirable to throw the soil together into beds, leaving a double furrow between each bed to carry off surplus water. Where the flooding system of irrigation is practised the beds must be levelled and a system of ditches and ridges provided for distributing and controlling the water. Where it is merely desired to secure surface drainage the beds may be from 75 to 150 feet in width, but for irrigation purposes the beds are generally but 12 or 15 feet in width. If spring ploughing is practised the soil should be harrowed closely behind the plough in order to prevent drying out.

For cutting and pulverising the soil there is perhaps no tool as serviceable as the disc harrow. There is a type of disc having four gangs, in two sets, one combination in front of the other, and so ar-

ranged that the soil is first turned to the centre and then turned outward again by means of the rear combination. This tool turns the soil twice and leaves it in a level condition.

For imparting the final smoothing touch to the soil before planting there is a device consisting of a large number of small discs set in a wooden frame which does about the same work as a steel rake, but in a rapid manner. A drag or float made from several pieces of scantling nailed together may be used for this purpose, or if the soil is very loose a roller should be run over it. The final levelling should be performed with a tool that will fill and obliterate all tracks or depressions in the soil, leaving a smooth, even seed bed for either seed sowing or transplanting.

FERTILISERS.

As the onion is an intensive crop and yields great quantities of marketable bulbs for the area planted, the grower is justified in manuring heavily. It would be difficult indeed to make the soil too rich for onions provided the manures are thoroughly incorporated with the soil. A heavy application of fresh, raw manure just before planting would have an injurious effect, but where the manure is well rotted and uniformly applied there is nothing to be feared.

Animal Manures.

There is perhaps no fertiliser so well adapted to the production of onions as plenty of clean, well-composted stable manure, and the quantity and frequency of application will depend upon the nature of the land under cultivation. The Bermuda onion-growers of South-Western Texas apply as high as 20 tons of sheep and goat manure to an acre every three years. In addition to the manure there is used 1,000 to 2,000 pounds of cotton-seed meal or commercial fertiliser, and sometimes a top-dressing of nitrate of soda. This sheep and goat manure is from animals that are fed largely upon cotton-seed meal, is saved in the corrals in a climate where there is very little rain, and it contains the essential fertilising ingredients in very high percentages. The manure is first piled where a little water can be thrown over it and is composted for several months before spreading on the land. The best results from this manure are not realised until the second or even the third year after its application.

All stable manure used on onion land should be well composted before use and then spread upon the land several months before planting to onions.

Large quantities of fresh manure applied to onion land just before planting will have a tendency to produce an over-growth of tops at the expense of the bulbs. This is especially true on irrigated lands and soils that are naturally moist.

Commercial Fertilisers.

Where there is an abundance of humus matter in the soil the onion crop will be greatly benefited by moderate applications of high-grade commercial fertilisers. A fertiliser that is suited to the growing of onions should contain 4 to 5 per cent. of nitrogen, 5 to 7 per cent. of phosphoric acid, and 8 to 10 per cent. of potash.

If it is found desirable to secure the ingredients and mix the fertiliser at home, the following materials and proportions are suggested:

	Pounds.
Nitrate of Soda, 14 to 16 per cent. Nitrogen	300
Dried blood	500
Acid Phosphates	800
Muriate of Potash, 50 per cent.	400

The ingredients of these fertilisers should be mixed until shortly before they are to be usd, as there is danger of loss from chemical action. In mixing, the proper quantity of all ingredients should be weighed and dumped together in a heap on a clean, tight floor. The work of mixing can be done by shovelling over three or four times, but should continue until all lumps are broken and the mass has assumed a uniform colour and appearance.

Commercial fertilisers should not be applied until shortly before sowing the seed and should be uniformly distributed and thoroughly worked into the soil. There are one-horse fertiliser distributers that scatter the fertiliser broadcast, but where an amount not exceeding 1,000 pounds of fertiliser to the acre is being used the work of distribution may be performed by means of a common grain drill having a fertiliser attachment. On a small scale the work is generally performed by hand.

Many growers follow the practice of applying only a part of the fertiliser at planting time, reserving the balance to be put on as a top-dressing at some time during the period of cultivation. This plan is especially desirable where onions are grown during the winter, as the application of the highly nitrogenous fertilisers in the autumn is liable to promote a soft growth that will be injured by cold. If the fertiliser is not put on until the cold weather is over, the crop may be forced without danger of injury. For this purpose only those fertilisers of a very available form will answer. Nitrate of soda is frequently used as a top-dressing during the height of the growing period.

PROPAGATION.

Propagation from seed is conducted by three more or less distinct methods: First, by sowing the seed in the rows where the crop is to grow and mature: second, by sowing the seed in specially prepared beds and

transplanting the seedlings to the open ground; third, by first growing sets from seed and then, after keeping them through the winter, planting them in the field to produce the crops of mature bulbs. Of these three methods the one first mentioned of seeding in the rows where the crop is to mature is the only one that is practical on a very large scale. Planting sets and transplanting have their advantages, but could not be applied on a large scale owing to the amount of labour required.

Planting the Seed.

In the northern onion-growing districts the seed is sown as early in the spring as the soil can be brought to the proper condition. While it is desirable to plant quite early it never pays to sow the seed before the land is in the best possible condition. When the soil has been brought to a smooth, even surface and is fine and mellow, the seed is sown by means of one of the common seed drills, of which there are several makes upon the market. The hand drills, which sow one row at a time, are extensively employed, but many of the larger growers employ a gang of drills hitched together and plant from five to seven rows at once. A more even distribution of the seed will be secured by the use of the single-row hand drill owing to the closer attention that can be given the one machine. The first row may be planted with a line, and after this the marker on the drill indicates the next row. The drills are so arranged that the shoe and covering blades can be regulated to cover the seed at the proper depth, which will vary with different soils. In heavy or moist soils the depth to cover the seed should not be more than one-half to three-fourths inch, while on loose and sandy soil the seed may be covered an inch or more.

Planting Distances and Seed Required to Plant an Acre.

Where hand cultivation is practised throughout, the usual distance between rows is 12 or 14 inches. Where horse culture is employed the distance between rows varies between 24 and 36 inches. The quantity of seed required to plant an acre will depend both upon the distance between rows and the purpose for which the onions are being grown. For the growing of standard market onions in rows 14 inches apart, about 4½ pounds of first-class seed will be required. With the rows 3 feet apart, but 1¼ or 1½ pounds will be necessary. Where it is desired to produce small onions for pickling purposes, the amount of seed may be as great as 25 pounds to an acre. Good seed is essential, and if there is any doubt regarding the vitality of the seed it should be tested before planting by counting and planting four or five hundred seeds in a window box and then determining the germination by counting the seedlings after ten days' or two weeks' time. Old and inferior seeds are not only low in percentage of germination, but lack the vitality

necessary to produce strong, healthy plants. There are dealers who make a speciality of securing and furnishing extra-quality onion seed, and, while their prices are often somewhat above the general market, the seed furnished by them is always preferable to ordinary seed.

Thinning.

Experimental growers are frequently able by using extreme care in regulating the drills to distribute onion seed in rows where the crop is to mature so that little thinning will be necessary. Thinning is generally left until the time of the first hand weeding, when all thick bunches along the rows are thinned to a uniform stand of eight or ten plants to the foot. It is always well, however, to allow for considerable loss of plants, and unless the plants are so thick as to actually crowd, thinning will not be necessary.

Transplanting Method of Growing Onions.

The transplanting process, often spoken of as the "new union culture," is merely a modification of the regular seeding method. The objects gained by transplanting are an earlier crop, a uniform stand, and bulbs of more regular size. Practically the entire Bermuda crop of the Southern States is handled in this manner. Where a small area is to be grown, the transplanting process is the ideal method, but for large acreages and where labour is difficult to obtain this would not be practical. After transplanting, the seedlings will require rain or watering in order that they may start, and for this reason the transplanting process is practically limited to areas where some form of irrigation is available.

In growing onions by the transplanting method the seed is sown in greenhouses, hotbeds, cold frames, or specially prepared beds at the rate of 3½ or 4 pounds for each acre to be planted. When the seedlings are grown under cover, they are given the necessary attention regarding watering and ventilation and kept growing quite rapidly until near the time for setting them in the open ground. As planting time approaches, the seedlings are "hardened" or prepared for transplanting by increased ventilation and exposure and by withholding water. When ready to transplant, the seedlings should be somewhat smaller than a lead pencil and rather stocky. The plants are lifted from the seed bed and the roots and tops both trimmed somewhat. They are then packed neatly in shallow boxes for removal to the field where they are to be planted.

Various methods are employed for handling the plants in setting. As a rule, a line is used and the land marked to indicate the location of rows. Several methods are employed for marking the distance between plants in the rows; one method is by means of a line with small

lead or brass indicators at regular intervals; another method is by means of a board having notches or holes in which a pointed dibble is thrust to form a hole in which to set the plant. A marking device much used by the Bermuda onion-growers in Texas consists of a sectional roller with the sections the same distance apart as the distance between the rows and each section provided with conical pins to form the holes in which the plants are set. The objection to the sectional roller marker is that it can not easily be drawn in a straight line, and straight rows are essential to good cultivation.

After marking the land, the plants are dropped ahead of the planters, or they may be kept in the trays and simply removed as planted. The transplanting process consists mainly in pushing the root end of the seedling into the soil with one finger and then firming the soil about the plant. This work is very laborious and can only be performed economically by very cheap labour. A small plough, such as is generally included with the attachments of the wheel hoe, is often employed for opening a furrow in which to set the small onion plants. As the plants are set the soil is either drawn about them by hand, or the plough may again be used for this purpose.

Propagation by Sets.

The use of sets is still another modification of the regular seeding method, in which the seed is planted one year to form the sets from which to grow a crop of mature onions the following year. Like the transplanting process, the use of sets is limited in its application. Onions grown from sets will ripen earlier than those from seed sown in the field, but the use of sets for commercial onion-growing is not so practical as transplanting seedlings. In planting onion sets a furrow about 2 inches deep is opened, the sets being dropped about 3 inches apart and firmly covered. For best results the sets should be placed in an upright position. The quantity of sets required to plant an acre will depend upon their individual size and planting distances, but it is generally between eight and nine bushels.

METHODS OF TILLAGE.

The cultural requirements of the onion are frequent shallow stirring of the soil and freedom from weeds. The feeding roots of the onion run close to the surface of the soil and should not be disturbed by deep cultivation. Sometimes a heavy rain immediately after seeding will so pack the surface that the seedling can not break through. Under such circumstances it will be necessary to slightly break the surface by means of a steel rake or a rake-like attachment on a cultivator. As soon as the plants are up and the row can be followed the cultivator

should be started to loosen the soil, which is always more or less compacted during seeding.

Hand Cultivation.

Where the rows are 14 inches or less apart, the work of caring for the crop must all be done by hand. For this purpose the wheel-hoe tools of various types are essential. These implements are provided with several kinds of hoes, cutters, and sweeps designed to work the soil away from the plants, to shave the surface and destroy weeds and to stir the soil and work it back around the plants. Onions grown on muck and alluvial soils will require from eight to fourteen workings with the wheel-hoe implements; on sandy soils it will not be necessary to cultivate so frequently.

Several types of wheel-hoe are in use, but those having a single wheel and passing between the rows are most desirable.

Horse Cultivation.

In sections where onions are grown on a soil that is not well adapted to hand culture the rows are placed 30 to 36 inches apart and the cultivation is done by means of horse-drawn tools. This is particularly true where onions are grown on the "black waxy" soils of Texas and other soils of the prairie type. As with hand culture, frequent shallow stirring of the soil is essential, the work generally being performed with one of the harrow-tooth cultivators. An implement known as a weeder can be used for breaking the surface before the seedlings appear: also for general cultivation by removing a tooth at the point where the rows are located

Hand Weeding.

It is well-nigh impossible to produce a crop of onions without some hand weeding. During favourable seasons the strictly hand work may be reduced to but one or two weedings, but a greater number will be necessary during rainy seasons.

(*To be continued.*)

If the cover of a fruit jar stick do not attempt to wrench it off; simply invert the jar and place the top in hot water for a minute. Then try and you will find that it turns easily.

Handling Grain for Export.

BULK *versus* SACKS.

THE way in which grain is handled, whether in bulk or in sacks, naturally affects its transportation by rail in various ways. It is apt to affect the rate of the grain. It affects the quantity of it that can be got into a truck, and it also otherwise affects the cost of rail for transportation. It has furthermore a relation that is not generally recognised to the subject of truck shortage, and to the kind of trucks used in handling grain. By far the greater portion of the grain grown in the United States has for many years been transported to market in bulk. In other words, it has been run from the threshing machine or sheller into the farmer's wagon, thence either to the nearest country elevator or else to the farmer's granary to be later on taken to the elevator. In the elevator, being loose, it is mixed with grain received from other farmers, run into railway trucks as soon as there is sufficient to fill a truck, hauled in truckloads to the terminal elevator, and finally exported and delivered to the miller in bulk. While most of the grain is thus handled in bulk by means of the elevator system, there is nevertheless an appreciable portion handled in sacks, this being the system largely in vogue in the extreme north of the United States.

The story of the grain elevator system in the United States, its origin and its development to its present enormous proportions is told by Mr. Samuel O. Dunn in the *Railway Gazette* of the 18th and 25th June, in an article dealing with the two methods of handling grain referred to above. In the words of the author, "the grain elevator system, which is now one of the most characteristic parts of the machinery of the United States, has grown up largely in response to the same demand, and has been given its present form largely by the same conditions that have stimulated and shaped the growth of the American railway system, with which it has always been very closely interwoven." Mr. Dunn's article contains so much of interest at the present time to the South African mealie grower, produce merchant, and grain exporter, that we propose to make a resume of the article for the benefit of readers of the *Journal*.

To begin at the beginning, the Chicago Board of Trade was organised in April, 1848, with the object of establishing a point where buyers and sellers of grain could meet to transact business. At that time wheat was hauled to Chicago in wagons from a redius of 100 miles around, and was sold in the Chicago market at 40 cents (1s. 8d.)

a bushel. Not only were there no railways to transport it, but roads and even bridges were wanting, and the farmer's profit from his crop, of course, was negligable. The issuance of a charter to the Illinois and Wisconsin Railway Company in Illinois in 1851 marked the beginning of the development of the so-called "granger railways." The Illinois and Wisconsin is now a part of the Chicago and North-Western system. As the various railways pushed out from Chicago the grain dealers in that city sent buyers to the country stations, who were either merely agents for the Chicago merchants or did business on capital furnished by them. In either case the grain bought at the local station was usually purchased either directly or indirectly on the account of the Chicago merchant and shipped to him. No one can say just when or where the first grain warehouse bearing any resemblance to the modern elevator was built. In the early days, however, the farmers of the Middle West hauled the grain to the local railway stations in sacks, from which the grain was poured into a hopper and elevated by means of an endless chain of buckets into bins, from which again it was discharged by gravity into the railway trucks. Horse power was used for elevating the grain into the bins.

Elevators soon came to be put up at numerous country stations along every line of railway; and they were well patronised from the first, because they met with the needs of all directly concerned—the farmer, the grain dealer, and the railway. By enabling the farmer to deliver grain in bulk they saved him the expense of buying fresh sacks every year. If his grain came from the field wet, the elevator manager had facilities for preventing it from spoiling that no individual farmer could provide. Grain grown in the Middle West, it is said, must sweat somewhere: if it does not sweat in the sack it is apt to sweat in the bin, and if it does not sweat in the bin it is apt to sweat in the flour. Again, the elevator was not only a facility for transferring the grain from the farmer's wagon to the railway truck but it was also a storehouse; the fact that the dealer had a place to keep the grain if the market was unfavourable after he bought it, enabled him to take it as fast as it came in, and then hold it for a good price, a thing that the farmer with his lack of financial resources could not do.

The presence of elevators on its lines was, furthermore, advantageous to the railway. Grain could be accumulated in the elevator until there were several truck loads and then poured rapidly into the trucks. This made delays to rolling stock less than when the grain was shovelled from the farmer's wagons into trucks or was transferred direct from the farmer's wagon to the trucks in sacks. At one time there used to be a number of little flat warehouses along the railways in the Middle West, some of them having a capacity of not more than

400 muids. It took two, three, or even four days to scoop enough grain from one of these to load a truck. On the other hand, the ordinary country elevator had a capacity of several thousand bushels; a modern country elevator usually has a capacity of no less than 25,000 bushels (which is equivalent to over 8,300 muids), and from ten to fifteen trucks can be loaded daily. As Mr. Dunn points out, where sack grain is accumulated in flat warehouses before being loaded on cars, the delay which loading it causes to railway equipment is less than the delay that would be caused by shovelling it from a wagon into a truck, but it is substantially greater than the time taken to load trucks from an elevator. In seasons of heavy railway traffic the elevators afford a place where large quantities of grain can be stored awaiting trucks; and therefore it is contended, the elevator system tends to reduce the congestion of traffic at such times.

Besides these country elevators, there are the large terminal elevators situated at the large markets and points of export. The advantages to the farmer, the shipper, and the railway of these terminal elevators were early recognised. The grain as it comes from the farmer in the Middle West often needs to be dried, cleaned, etc., to render it fit for export or for milling. For example, occasionally during a wet season, there is a soft maize crop in Illinois. Mealies in this condition cannot be transported far without spoiling. It is necessary to get it as soon as practicable when it can be properly treated, and this usually can only be done in a large terminal elevator, for the country elevators are seldom equipped with machinery for any purpose but the transferring of grain—elevation properly so-called.

The facilities offered by the establishment of both the country and terminal elevators were realised by all concerned in the handling of grain. The advantages were realised by the railways quite as much as by the producers, merchants, and consumers, and consequently the railways in the Middle West did all they could to stimulate the development of the elevator system. In some cases they built and operated both country and terminal elevators themselves. In other cases they furnished the capital for the organisation of companies which built and operated the elevators. In other cases they built elevators and leased them at low rentals to grain dealers. In still other cases they leased land to private individuals for the construction of elevators at purely nominal rentals—at $1, $2, or $5 per annum. The operations in connection with these elevators appears to be somewhat as follows: The grain is usually bought in the country by the manager of a country elevator. It is weighed, taken into the elevator, and paid for, and the transaction is completed so far as the farmer is concerned. Occasionally the farmer puts his grain into the elevator subject to order for

future shipment, or sells to what is known as a "truck-buyer," in which case the grain is delivered directly from the wagon to the truck. The owners of country elevators sometimes have no connection with any terminal elevator, in which case the grain is sold f.o.b. at the country station and consigned to the owner in care of some commission house at a central market. In most cases, however, the country elevator is one of a string of elevators that is operated by some concern which also operates large terminal elevators and buys and sells grain. Ordinarily such concerns keep their business as operators of elevators and their business as dealers in grain nominally separate.

An idea of how the elevator system has grown will be gained when it is stated that at 25 large terminal markets or exporting points in the United States there are 428 elevators with an aggregate capacity of 260,541,000 bushels (86,487,000 muids). Chicago contains the most, having 87 elevators. The maize crop of the United States in 1908 was 2,668,651,000 bushels; the oat crop was 807,156,000 bushels, and the wheat crop 664,602,000 bushels. The terminal elevators at the twenty-five centres referred to have therefore a storage capacity equal to considerably more than one-third of the total wheat crop, or to almost one-third of the total oat crop, or to one-tenth of the total maize crop. This, of course, besides takes no account of the thousands of country elevators, one of which is found at almost every country station of importance, and of which there are sometimes as many as eight or even twelve at an important station in the grain belt.

The terminal elevators at most points are divided into two classes —public and private. The private elevators handle only grain bought and sold by their proprietors, and are equipped with machinery for grading, blending, etc. Public elevators transfer and store grain for everybody who tenders it, and the owners are not allowed to handle grain belonging to themselves. They have no machinery for treating the commodity, and are required always to keep the same grade in the same bins. The storage rate at Chicago is three-quarters of cent (three-eighths of a penny) per bushel per day for the first ten days, and one-fortieth of a cent (one eightieth of a penny) for each additional day.

While the system of handling grain in bulk through elevators has become almost the only method used in the Middle West, the system of handling it in sacks has grown up and is, as we stated at the beginning of this article, still the prevalent method in the extreme North-West. There the farmer sacks his grain in the field when it is threshed, and it is hauled in sacks to a flat warehouse at the country station instead of to a elevator. It is also hauled in sacks by rail, and when it reaches the large markets on the Pacific seaboard, it is put into large, flat

warehouses in sacks. Some of the warehouses have a capacity of as much as 2,000,000 bushels.

Whether the system of handling grain in bulk is to be preferred to that of handling in sacks depends for its answer upon the conditions prevailing in the country concerned: the system that suits one country might not suit another, and in the United States we have an instance of the two systems working side by side, a result of the diversity of conditions to be found in such a large country. While some of the railway officers in the United States who have investigated the subject regard the argument in favour of bulk handling as conclusive, others think that there is much to be said in favour of handling in sacks. The main reason, says Mr. Dunn, why the system of handling in sacks has held its own is that a very large proportion of the grain grown in the North-West is exported to Europe and Asia. The amount exported fluctuates greatly from year to year according to the size of the yield, the Oriental market for grain and the proportion of the total crop absorbed by the flour mills; and the proportion taken by the flour mills depends upon the condition of the export flour trade, particularly to the Orient. The wheat exporters on the coast do not favour bulk shipments by seed or bulk handling of wheat from the country railway stations to terminals. Grain making the long voyage from the North Pacific Coast to Europe must cross the equator twice, and it is claimed that when shipped in bulk it will heat and reach Liverpool in bad condition. Another objection to bulk shipments is to be found in the fact that so many varieties of wheat are grown in the North-West—eight distinct varieties being produced in Eastern Washington alone—that it is impossible to make a full cargo of any one kind. Furthermore, the exporters claim that the necessary investment in elevators both at country stations and terminal points is so much greater than in the flat warehouses that they could not successfully compete with the flat warehouses unless the railways charged a higher freight rate on sacked grain, in which event the net return to the farmer would be decreased. Other objections brought forward to the adoption of bulk shipping in preference to handling in sacks are that it would endanger the boats in which the grain was carried—it is said that even under the present system of stowing grain in sacks and securing it by boards to prevent it from shifting from one side of the boat in a heavy sea in a manner impossible with bulk grain, no seed impasses without some of the grain fleet being damaged or lost through the shifting of the cargo in the heavy seas met in the vicinity of Cape Horn; that the handling of grain in sacks is to a great extent preferable on the railway by reason of the fact that it must be handled in box trucks, while any kind of freight car can be used for sack shipments.



PERUVIAN MEALIES.

In view of the renewed interest in Maize Cultivation at the present time we make no apology for reprinting the above illustration, which appeared in our February, 1904, issue. The photo. was supplied by Mr. Deane, the present Minister of Agriculture, and depicts a good stand of Peruvian mealies growing on Mr. J. Varty's farm at Reit Vlei. Mr. J. Varty, who is 6 feet high, is seen standing in front of the mealies. The mealies were planted on October 19th, 1903, and the photo. was taken by Mr. Deane on February 5th, 1904.

For these and other reasons grain is handled in sacks in the North-West of the United States. The question has, as we have said, to be decided by local conditions; it is difficult to find two countries whose grain trade is carried on under exactly similar conditions, and the methods of procedure must necessarily differ in each case. The foregoing information will, we think, prove interesting and instructive to South African producers and shippers of maize as showing the methods which are in vogue in the greatest of all grain producing countries—the United States of America.

Better than a Poultry Yard.—The objections to a yard for fowls are that all vegetation in it will soon be killed and then the birds are confined on bare land, and land that is rapidly made filthy. Also the manure is badly wasted. A writer in the *American Thresherman* remarks that a hurdle can be made quickly, that is durable, light, will not blow down, is inexpensive and enables the owner to give the birds clean range and use the enriched land for crops. It is in the form of a capital I, laid on one side. Scantling or poles twelve feet long with a hole bored in each end are procured and end pieces four, five or six feet long, according to the height of fence needed. A hole is bored through the middle of each end piece. Only one long strip is required for a hurdle. Fasten to it end pieces by driving through the holes a heavy wire spike and clinching it. Now a galvanized wire is strained from the top of one end piece to the bottom of the other both ways and poultry net stapled tightly over all. The brace wires should be fastened well to the middle piece where they cross. The net should be six inches wider than seems necessary, the extra net to be left loose at the bottom to conform to inequalities of the surface. Now drive a staple in the top of each post at the side. Each must have a brace also and to one end of the brace a hook is stapled firmly. This hook is dropped into the post staple, permitting the hurdle to lean slightly against it, and from the yard that is being formed by the hurdles. When the fowls are roosting, a boy can easily unhook one hurdle at a time and carry it to new ground and set it; so with the entire line. A light roost on runners may accompany the hurdles a few feet at a time, by crowding it forward with a crowbar. This should be twelve feet long to match the hurdles, but not more than five feet high and wide.

The Milk Supply.

LECTURE BY PROF. LOUDON M. DOUGLAS.

AN interesting lecture on the subject of the milk supply was delivered at Catlin's Arcadia, Scarborough, on the night of July 2nd, by Mr. Loudon M. Douglas, of Edinburgh, who is well known as a lecturer and an author in connection with this subject.

The lecture was illustrated by means of a large number of lantern slides, illustrating various aspects of the question, and an interesting demonstration was also given of the contents of the milk, each constituent being shown in a separate bottle, which is a graphic way of demonstrating how the lactic fluid is built up.

The lecturer pointed out how important the milk supply was as a factor in the health of the nation, and how the intimate study of the question had only begun within the last quarter of a century. During that period, however, a large literature had grown up in connection with the subject in all civilised countries, and many difficult problems had presented themselves in connection with the original researches which had been made. Although at the present day we know a good deal about milk, there were yet many things which were unexplained. The article which was spoken of in connection with the milk supply was cows' milk, and it was estimated that 1,723 million gallons were produced in the United Kingdom, of which 620 million gallons were consumed as milk, the remainder being utilised for butter and cheese. The consumption worked out to 13 gallons per head of the population, which, however, was behind the United States of America, where 25½ gallons per head of the population were consumed. In order to get this quantity a stock of a little over 4½ million cows, valued at £40,000,000 sterling, was required, which showed how gigantic an industry dairying was in the United Kingdom.

The lecturer proceeded to describe the physical properties of milk, and mentioned that one single drop contained many millions of the fine fatty globules which constituted cream, and those globules were so finely divided that it was stated that if a person attempted to count them it would take him ten years, provided he counted 100 per minute and worked for six days in every week.

The various breeds of cows were touched upon, and it was shown that the Dutch breed had so far excelled all others in producing a cow which gave for one year a total of 2,743 gallons, which is rather more than six times the quantity given by the average cow in the United Kingdom. The sensitiveness of milk to odours and germs of disease

was then touched upon, and the necessity for cleanliness and hygienic conditions was urged. Cleanly conditions were absolutely necessary to a wholesome milk supply. Tuberculosis was the principal disease which had to be dreaded in milk, and it was shown how this micro-organism could be injected into the system in a very simple way, through the milk supply, and it was one of the principal objects of the Milk and Dairies Bill, which had been recently issued, to try and prevent the spread of disease from tuberculosis. All diseases which could be milk-borne could, however, be controlled by means of heat, and this was called pasteurisation. It meant the total destruction of pathogenic or disease-producing germs in the milk. The average temperature used in pasteurisation of heating the milk was 170 deg. F., at which figure tuberculous germs were totally destroyed and all of the ordinary disease germs also.

The apparatus in connection with the application of pasteurisation was extremely ingenious and was fully illustrated and described. It had now become universal throughout the dairying industry, and it was therefore a splendid thing for the milk consumers that they could rely upon the milk which they took, being thus rendered wholesome and free from any hidden danger. It had been said that the pasteurising process was disadvantageous, as it produced carelessness on the farm and also that it affected the digestive properties in the milk, but those objections were only of a minor character. The only real objection was that the pasteurising process increased the cost. There were few people, however, who had taken the trouble to study the question, but would acknowledge that the increased expenditure was amply justified.

FALSE FLOORS IN HORSE STALLS.—The editor of *Wallace's Farmer* suggests, in reply to an inquiry, that the objection to cement floors in horse stables may be overcome very easily by putting false wooden floors in the stalls where the horses stand. He tells of a stable he has with a concrete floor throughout, but in the stalls are movable slat floors, which are hooked to the sill in front to hold them in place, but which may be raised up from behind when desired, or may be unhooked and removed altogether, in order to make a thorough job of cleaning. The false floors are made of elm slats, two inches wide, and set one inch apart.

Moles and their Destruction.

SOME USEFUL HINTS.

WE have received a request from a reader to be supplied with information regarding the destruction of moles, from the depredations of which animals he is suffering considerable loss, particularly in his tobacco fields. We have by us a leaflet issued some time ago by the Biological Survey Branch of the United States Department of Agriculture giving directions for destroying the little animals known in America as "pocket gophers." These pocket gophers differ somewhat from our local moles, but their habits are much the same and they appear to do just as much damage, and in just the same manner, as moles. We accordingly think that the recommendations of the Biological Survey Branch, as given in the leaflet referred to, for destroying these pocket gophers, will be equally applicable to the case of our moles; and as our correspondent's enquiry is of general interest we publish herewith such of the information contained in the leaflet as is likely to prove of general interest to Natal farmers.

The leaflet points out that pocket gophers may be destroyed by poison, by traps, and by the use of carbon bisulphide. Poisoning with strychnine is the most effective means known for killing pocket gophers, and, as it involves the least expenditure of money and labour, the Biological Survey recommends it for general use. As a rodent poison to be used by farmers, strychnine has several advantages. Its action is sure, its deadly character is known to most persons, and its bitter taste is an additional safeguard against mistaking it for a harmless drug. Strychnia sulphate is the most convenient form of the poison, since it is freely soluble in hot water and in the natural juices of vegetables used as bait. To disguise its bitterness so that rodents may not be deterred from eating the baits, sugar is often employed, or the strychnine may be mixed with its own bulk of commercial saccharine. A sugar syrup poisoned with strychnine may be used with excellent results. It is prepared as follows:—

Dissolve an ounce of strychnia sulphate in a pint of boiling water. Add a pint of thick sugar syrup, and stir thoroughly. The syrup is usually scented by adding a few drops of oil of anise, but this is not essential. If preserved in a closed vessel, the syrup will keep indefinitely.

The above quantity is sufficient to poison a half bushel of shelled maize or other grain (maize recommended). The grain is steeped in hot

water and allowed to soak over night. It is then drained and soaked for several hours in the poisoned syrup. Before using, mealie meal may be added to take up the excess of moisture.

Dry crystals of strychnine also may be used. They are introduced, by means of a knife, into small pieces of potato, carrot, or sweet potato, or into entire raisins or dried prunes. A single large crystal (or several small ones) is enough for each bait. Raisins are especially recommended because they are easily handled and contain enough sugar to disguise the bitterness of the poison.

The prepared baits are introduced into the underground runways of the gophers and are conveniently handled with a spoon. A stout dibble is used to make holes into the runways. This consists of a spade handle shod with a metal point and having a strong bar for the foot of the operator about 15 inches from the point. Having located the runway by use of the dibble, it is moved from side to side to make the soil firm about the hole, and then withdrawn. A piece of poisoned potato or raisin or a teaspoonful of the poisoned maize is dropped into the hole, which is left open. Some farmers prefer to cover the holes, but the experience of the writer of the leaflet is against the practice.

By this method but little labour is necessary, and the operator soon acquires skill in finding the runways. The bait should be placed in the main runways and not in the short laterals near the mounds. If placed in the laterals, the animals are likely to cover it with soil or throw it out without finding it. A skilful operator can go over 20 to 40 acres of badly infested land in a day, and, if the work is carefully done at a time when the pocket gophers are active, all the animals should be destroyed by the first application of poison.

TRAPPING.

Trapping is a successful method when followed intelligently and persistently. It is especially adapted to small fields, orchards, and gardens, where only a few gophers are present; but in the case of large areas that are badly infested, the method involves too much labour.

For trapping gophers an ordinary No. 0 steel trap may be employed, but there are a number of special gopher traps on the market that are better adapted for general use.

In using the ordinary steel trap, the first step is to make an opening into the main gopher tunnel. The trap should then be sunken so that the jaws are level with the bottom of the runway and lightly covered with green clover or lucerne or grass, or even loose soil, care being taken that these do not clog under the pan, or trigger. No bait is required. The hole should be just large enough to receive the trap and should be covered so as almost to exclude the light.

Besides the ordinary steel trap, various special gopher traps have found favour with farmers. Several traps are on the market whose main advantage lies in the ease and simplicity of operation and in the fact that they kill the animals instantly. All of them have been found to be excellent, but the simple ones have advantages over those with closed sides. The special traps should be set in the laterals leading into the main tunnel of the gopher, or at the entrance of open burrows where fresh earth is being thrown out. The trapper should choose the freshest of a series of mounds and dig along the lateral until it is found clear of soil.

CARBON BISULPHIDE.

Carbon bisulphide has been employed for killing pocket gophers, and under favourable conditions its use is recommended. If the burrows are extensive or the soil dry, the gases are dissipated so rapidly that a large quantity of the liquid is required to kill the animals and the method becomes too expensive. If, however, the burrows are simple and the soil moist, bisulphide may be used successfully. For pocket gophers an ounce of the liquid for each burrow is sufficient. The carbon bisulphide is poured over a bunch of cotton, rags, or other waste material and this quickly pushed into the burrow, which should be closed at once.

CO-OPERATION.

The leaflet concludes by remarking that any farmer may readily rid his premises of gophers by the use of poison or traps. "Unless, however, the entire community unites in active and intelligent co-operation in the destruction of the animals, the cleared area will be sooner or later invaded from neighbouring premises, and the work of destruction must be repeated. Co-operation only will effect a radical cure. When co-operative efforts for the extermination of gophers over a considerable area are attempted, careful attention must be given to waste lands along fences, streams, public highways, and railroads. Such places are favourite haunts of the animals, because in them are found loose, sandy soil, moisture, and succulent roots for food. It is from such resorts that adjoining farms are often restocked with pocket gophers."

Of all the animals kept on the farm the pig can consume feed and get the greatest gains from it, which will sell at a high price, with the least shrinkage when cut upon the block or trimmed for the barrel.

Potatoes for the Transvaal.

NEW REGULATIONS.

THE attention of all interested in the export of potatoes into the Transvaal is directed to the following circular letter which has been issued by the Transvaal Department of Agriculture, covering regulations which have been recently framed on the subject. We are indebted to Mr. Alfred Webb, produce agent to the Cape Government, P.O. Box 2342, Johannesburg, for copies of the letter and regulations. The circular letter is headed

RE-SORTING OF POTATOES AT JOHANNESBURG

and reads as follows:—

"SIR,—I have the honour to inform you that the important question of the re-sorting of consignments of table and seed potatoes which are imported into the Transvaal from Natal, Cape Colony, and Orange River Colony, as well as from oversea, has recently received our serious consideration, and the following scheme has been formulated, principally for the purpose of enabling our farmers to procure large quantities of seed potatoes free from disease.

"1. All consignments of potatoes which are imported from oversea or from neighbouring Colonies will be inspected upon arrival in the Transvaal at Volksrust, Vereeniging and Christiana, and if found to be free from insect pests and plant diseases will be immediately forwarded to their destination, but if found to be infested with any disease the consignors or consignees will have the option of having such consignments despatched to Johannesburg at their expense for the purpose of being sorted there under the supervision of our Plant Inspectors. A charge of 6d. per case or bag will be made in order to cover the actual cost of re-sorting the potatoes. In the case of seed potatoes in full trucks intended for Johannesburg and Pretoria, such will not be detained at the Border stations, but will be examined upon arrival at destination. In the case of consignments of seed potatoes from oversea, if the consignors or consignees are not desirous of paying such charges, the consignments will have to be destroyed at the Border stations within four days after arrival, as the other Colonies, and also the Government of the Province of Mozambique, have recently enacted legislation to the effect that such consignments which contain a certain percentage of disease must not be re-consigned out of the Transvaal.

"2. All consignments of potatoes which are found upon arrival to be infected with scab (*Chrysophlyctis endobiotica*, Schil.), will not be

re-sorted, but will be destroyed immediately upon arrival in the Transvaal, and a copy of Government Notice referring to this disease is attached for your information.

"3. The Director of Customs has agreed to assist us in this matter, and all importers of potatoes must obtain a sorting order from the principal customs office at Johannesburg between the hours of 9 a.m. and 3 p.m. each day, and all monies must be paid into this office for such work.

"4. It must be distinctly understood that it will be impossible to have any consignments of seed or table potatoes re-sorted at the Border stations, *viz.*, Volksrust, Vereeniging, and Christiana, on account of the fact that we have only one Inspector at each of these stations, and his time is fully occupied with the ordinary work of fruit and plant inspection.

"I have the honour to be, Sir, your obedient servant,

"F. B. SMITH,
"Director of Agriculture."

This is followed by a copy of Government Notice No. 646, 1909, which runs thus:—

GOVERNMENT NOTICE.

It is hereby notified for general information that His Excellency the Governor has, under the powers in him vested by Section 1 of Ordinance No. 16 of 1904, been pleased to make the following additional Regulation for preventing the introduction and spread of insect pests and plant diseases in this Colony.

F. B. SMITH,
Director of Agriculture.

Office of the Director of Agriculture,
Pretoria, 9th June, 1909.

Regulation.

On and after 1st September, 1909, no person shall introduce into this Colony from outside South Africa any consignment of potatoes unless accompanied by a certificate from the consignor stating fully in what country and district of that country the potatoes were grown, and also a certificate from the Board of Agriculture of the country in which the potatoes were grown, to the effect that the disease known as warty disease or black-scab, caused by the fungus *Chrysophlyctis endobiotica*, Schil., has not been declared to exist in the district from which the potatoes come. Any consignments not accompanied by such certificates will be liable to be seized and destroyed by the Department of Agriculture.

Winter Feed for Stock.

By E. J. Macmillan, B.S.A.,
Assistant Director of Agriculture, O.R.C.

(A Paper read before the O.R.C. Agricultural Judges' Association, June, 1909.

The problem of winter feed for stock is demanding increased attention year by year. In times past it was not so necessary for the farmer to provide a supply of feed for his stock. The farms were larger, fences were fewer, and the restrictions on the movement of stock not so great as to-day. The old plan of trekking to fresh pasture when feed became scanty is growing more and more impracticable. Besides, the development of the dairying industry has introduced a new factor in the feeding problem. Creameries have been established, and, if they are to be placed on a basis of permanent prosperity, cream must be produced and herds must be kept in milk the year round.

Sheep feeding in the winter season also demands attention when winter lambs are raised, and it is not only in the winter season but in time of drought that a supply of surplus stock food is necessary. The history of South Africa shows that there have been lean years as well as fat ones for farmers, years when the rains were delayed and the stock suffered, and in some instances died on the bare veld. These periods may occur again, and when they do come the stockman who has adopted the system of growing feed to supplement the veld pasture will undoubtedly fare the best.

Crops for the production of winter feed may be divided into two classes—those which are pastured or fed off the ground, and those that are stored until required. The advantages of the first-named class appeal to the average stock-farmer who has not the appliances and means at hand to store food.

Grasses.

The search for a suitable winter grass has not been wholly successful in this Colony. Several grasses have been found to make a satisfactory growth in the first season, but before the lapse of another year they have been almost smothered by wild grasses and weeds. The veld grasses which have persisted under natural conditions are all susceptible to frost, and die down at the first approach of winter, and it seems difficult, if not impossible, to find a variety which will be equally resistant to drought and frost.

The grasses which have given the best results among the varieties tested at the Experimental Farms for winter feed are: Perennial Rye, Rescue Grass *(Bromus Uniloides),* and Tall Fescue (probably the same as Southey's Tussock grass). When sown at February 1st these are capable of producing a considerable amount of feed by the follow-July. Perennial Rye has given rather better results than the other two, but for a field crop the three varieties may be sown mixed together with advantage. About twenty pounds of seed should be sown per acre, and harrowed in with a light harrow on a seed bed which has previously been brought into a fine condition by ploughing and cultivation.

Grasses should be sown late in the season to escape the hot drying winds and sufficiently early to get a start before the frost comes. February meets these conditions best. Where it is desired to lay down old mealie lands to grass, good results can be obtained by sowing the seed between the rows of mealies just before the last cultivation is given. The mealie crop provides a shade for the young plants, which are thus enabled to get a favourable start. In a plot seeded to grass in this way at Grootvlei last year, there are now bunches of Rye and Rescue grass looking quite green and standing three to four inches high though the ground was chiefly occupied by native grasses during the summer.

Perennial Rye readily forms tufts and produces a thick growth of fine, soft dark green leaves. It withstands frost without injury as long as there is any appreciable amount of moisture remaining in the ground. On rich soil it responds with an abundant growth. A plot sown at Grootvlei in February bears tufts six inches high at date.

Rescue grass, the Prairie grass of Australia, properly called *Bromus Unioloides,* is very hardy and grows throughout the winter season. It is distinguished by a broad leaf, and bears somewhat sprawling stems, with heads which look not unlike flattened oat heads.

Tall Fescue in its manner of growth resembles Rye grass but is stronger and coarser in the leaf. It resists frost and furnishes seed of good quality.

Phalaris, the new Canary grass, introduced into South Africa from Australia, is said to be both drought and frost resisting. A plot of this is under trial at Grootvlei. It is yet too soon to speak definitely of its possibilities, but, so far, it has not shown any advantages over Perennial Rye and Rescue grass sown on adjoining plots at the same time.

Meadow Fescue and Italian Rye grass are also suitable to be sown for winter pasturage.

WINTER OATS.

In the grain-growing districts winter oats may be used to provide pasturage, especially for sheep, during a great part of the winter sea-

son. The English winter (dun-coloured grain) is a suitable variety to be sown for this purpose. The seed should be put in the ground at March 1st. In the average season the crop will then be ready for stocking in the beginning of June. Four pecks of seed are sufficient to sow an acre. When the season is favourable a crop of grain may be secured. It is not advisable to keep stock on the crop later than August 1st, if importance is attached to the grain harvest.

Burnet.

Burnet is a hardy perennial which withstands frosts and makes a good growth in the winter season. It is inclined to become woody when mature, but it is, nevertheless, valuable as a food for sheep. It is one of the most successful of the new perennials introduced. The quality of pasturage is very fair. Its chief value lies in the fact that it grows and remains green throughout the winter, and during severe drought.

To produce winter pasturage, Burnet should be sown in January. A plot of six acres sown at Grootvlei in January last is now almost covering the ground with bunches of green herbage three to four inches high. Better results have been obtained from sowing in 18in. rows than from broadcast seeding, though the latter has by no means proved a failure; about 15 lbs. of seed should be allowed per acre.

The following yield was obtained from a small plot of Burnet established in December, 1907:—

Date of Cutting—	Weight of green crop per acre. lbs.
September 23	5,650
November 21	1,400
January 25	3,000

The cutting made on September 23rd was mainly the result of winter growth, and serves to show how this plant produces in the winter.

Sainfoin.

Sainfoin furnishes feed of finer quality than Burnet, and, being one of the Leguminosae, it is also a better soil improver. It has been proved difficult to establish as a field crop, though favourable results have been got by means of its cultivation in small plots. It is a perennial and withstands frosts; therefore, if some practical method of extensive cultivation can be found, it should prove a valuable addition to the list of forage plants for the High Veld.

Three cuttings were obtained from a small plot at Grootvlei last season, the yield of green fodder being as follows:—

Date of Cutting—	Weight of green crop per acre. lbs.
September 5	5,100
November 10	1,500
January 20	2,250

Sainfoin has proved about equal to Burnet in the amount of fodder produced. The heaviest cutting, it will be observed, was the first, showing good winter and early spring growth. Sowing in the latter part of March is to be recommended, quantity of seed per acre, 20 lbs.

This plant must be considered as still in the experimental stage under O.R.C. conditions, and further trials are necessary to demonstate whether it is to be relied on as a general forage crop.

SALTBUSH.

Australian saltbush has proved its value as a forage plant in trials made at Grootvlei during the past four years. It is a splendid drought resister when once established, and it is available as feed for cattle and sheep either in times of severe drought or in the winter, when the veld is brown and bare. Saltbush is particularly valuable for planting on shallow brak soils where many other crops will not grow, and, owing to its drought-resisting qualities, it is well suited to the western portions of the Colony. One variety—"Old Man"—stands out ahead of all others as the most suitable saltbush for cultivation under our conditions. It grows to a height of six feet, with branching woody stems, but bearing an abundance of shoots which are much relished by stock. Saltbush seed has been distributed throughout the Colony with varying results.

A number have succeeded in establishing it, while the majority have reported failures. In the latter case the difficulty appears to have been largely due to wrong or doubtful methods of planting. To ensure success the seed should be sown in tins, and when the plants are well up they should be transplanted into other tins or nursery beds, and finally set out in the ground when they are strong and in a flourishing condition. January or February, as rain permits, is the most favourable time for planting out. The ground should be well prepared previously by ploughing and harrowing. It is necessary to keep stock off the plantation for the first year.

RAPE.

Rape is a king among winter forage plants for the sheep farmer. When sown at intervals from February 15th to the end of April it can be relied on to produce a satisfactory growth, and will furnish a supply of green fodder throughout the winter season. There are two essential conditions necessary in the production of rape—moisture

to ensure a start for the crop, and a fairly fertile soil. Though it will grow on poor soils, it is not a satisfactory crop. Even in the driest portions of the Colony there is generally enough moisture in the ground at the end of February to give rape a good start. It is therefore suitable for general cultivation. The rape plant attains a full growth in three months from seeding. Thirteen tons of green crop per acre were produced at the Grootvlei Experimental Farm from a plot sown at March 1st. This piece of ground was well enriched with stable manure. Much less, or one-third of the above-mentioned yield, would furnish a profitable return as pasturage. For winter feeding rape should be sown in time to make a good growth before frosts set in. The plant is not injured by frost, but it grows very slowly in cold weather. To provide for early spring feed it is advisable to sow the seed in April.

The crop succeeds best grown in rows, which should be about 3 ft. apart, but the seed may also be sown broadcast with satisfactory results. The quantity of seed required is 5 lbs. broadcast, or 2 lbs. in rows.

When sown in rows and cultivated rape makes a strong growth, and may be cut and drawn to a paddock or yard for feeding; otherwise it may be treated as a pasture crop. Sheep may be conveniently pastured on rape enclosed in a field made of hurdles or wire netting, a small piece being allowed at a time and the enclosure being removed to a fresh portion of ground daily. This system, though somewhat troublesome, is the most economical of feed and also enriches the soil.

This crop is very suitable for ewes with winter lambs, but it may be fed with advantage to all classes of sheep, pigs, and cattle, except cows giving milk. It is a valuable fattening food; Merino hamels now being fed in a fattening experiment have gained 10 lbs. per head in four weeks, when allowed nothing but rape and grass veld.

Care is necessary when stock are first turned into rape to prevent bloating. They should not be allowed to gorge themselves with it when they have not been allowed other food for some time.

Mangels.

Mangels are another useful crop which does not require storage, but may be fed from the field.

The mangel requires a long season in which to complete its growth, and should be sown not later than November. The roots will then be ready for feeding at the 1st of June. In trials made at the Experimental Farms mangels have proved superior to all other root crops in respect of drought-resisting qualities and yield.

During the past season as much as 26 tons per acre was obtained of the Giant Sugar Mangel.

STORED CROPS.

Hay.

Few farmers take advantage of the opportunities afforded by the summer crop of veld grass to store hay for winter feeding, yet this furnishes valuable feed if cut at the right time. The only special implements required are a mower and a rake. The great secret in making good hay is to cut early before stems have had time to become hard and unpalatable as feed. The Common Rooi grass, which forms the bulk of veld hay, should be cut whenever all of the heads are fully up. Stacking is a perfectly satisfactory method of storing hay until it is required.

Teff Grass Hay.

Teff grass is an annual, and valuable chiefly as a hay crop. It is of no advantage to use for pasturage in the summer season when veld feeding is good, and it is of no value for winter grazing, as it becomes withered after the first frost. The seed may be sown in October, and if rains are favourable the grass can be mowed twice in one season. In the portions of the Colony where rains are usually late it is suitable to be sown in January, and will then produce one cutting, which requires about ten weeks' growth.

The soil for Teff grass requires careful preparation by ploughing and harrowing until a fine surface is obtained. Then the seed should be sown broadcast at the rate of 3 lbs. per acre, and covered lightly by means of a light harrow or weeder.

Upwards of two tons of hay per acre were obtained from this crop at Grootvlei during the past season. Though not a winter grass, Teff possesses value for the production of hay, and should prove particularly useful for cultivation on small farms where the area of natural hay ground is limited.

Ensilage.

Any system of winter feeding which does not embrace ensilage may justly be considered incomplete. A well-filled ensilage pit or silo affords the stock farmer a means of tiding over many a period of drought or dry winter veld without loss of flesh or milk in the herd. Ensilage is pre-eminently a cattle good, but it may also be used in limited quantity to feed sheep. Almost any green crop may be made into ensilage, but all things considered there is no crop so suitable for the purpose as mealies.

In the O.R.C. few seasons are so unfavourable that it is impossible for the farmer to grow mealies for ensilage. It should be borne in mind, however, that mealies half-grown, green, and filled with water make feed of very poor quality, and that the crop should be approaching maturity before it is cut and placed in the silo. Ensilage has sometimes been condemned owing to the fact that it was made from an immature crop, which was no fault of the system.

Mealies for ensilage may be planted as late as January 1st, but it is better to place the limit of planting a month earlier, as the prospects of securing a well-matured crop and getting it gathered before frost are thereby much improved. A little frost causing withering of the leaves does no harm. For good ensilage the material should retain much of its green colour and be free from any trace of mould. Its characteristic odour is like that of fresh malt.

A mealie crop which will yield five bags of grain per acre produces approximately five tons of ensilage. Ten tons per acre of ensilage may easily be obtained in a favourable season on good land. Four tons of ensilage are equal in feeding value to one ton of good oat hay.

It has been shown by experiments at the Tweespruit Experimental Farm that the cost to grow mealies and store the crop in the silo does not exceed 10s. per ton. The comparative cheapness of a ration based on ensilage is here made apparent.

Another advantage of this form of feed is that it can be kept from one year to the next without loss by deterioration. If the contents of the silo be not all required in the course of winter feeding the material will be found very useful during a summer drought.

Ensilage forms an excellent feed for the dairy cow, and can be recommended to farmers in the dairying districts without hesitation. The storing of ensilage is one of the most necessary steps towards the development of milk production in winter.

General.

The characters of the principal winter forage crops have been described in the foregoing chapters, and it may seem to the farmer that too many varieties have been recommended.

In conclusion it may be said, without doubt, that ensilage and rape are the outstanding winter feeds for cattle and sheep respectively. Hay, whether from wild or cultivated grass, is of good value, and hay-making is worthy of much more attention than it receives at present.

The grasses and other forage plants mentioned are deserving of a trial. To any person who wishes to lay down a permanent winter pasture the following mixture can be recommended: Burnet 5 lbs., Sainfoin 5 lbs., Perennial Rye 3 lbs., Tall Fescue 3 lbs., and Rescue grass 5 lbs., total 21 lbs. per acre. The cost of seed when purchased in quantities will amount to about £1 per acre. There is reason to believe that permanent winter pasture will prove fairly successful in the eastern portions of the O.R.C. In the drier districts rape may be sown annually to fulfil much the same purposes.

During the summer succeeding the sowing of the seed it will be found that wild grasses tend to crowd upon the introduced varieties, and when the frosts come will leave the field burdened with dry stalks. Mowing is the best remedy for this difficulty, the operation to be done not later than the end of January.

Fruit Fly Control.

DURING several years past the Eastern Province Entomologist of the Cape (Mr. C. W. Mally) has devoted considerable time and attention to the control of the most pestivorous of all South African fruit-pests, the Fruit Fly.

In the course of his labours Mr. Mally has, we understand, given considerable attention to the numerous devices and recommendations which have been put forward from time to time, and, as the result of his investigations, now gives prominence to that of poisoning the adult flies.

It is well known that fruit flies breed prolifically all the summer through in almost every fruit as it ripens, and their increase is only checked during the colder months and by the absence of food supplies. In Natal, the fruit fly is less abundant in winter than in summer, but it develops to a great extent in oranges and naartjes, particularly on the Coast; at the same time throughout a great part of the Colony where these fruits are not abundant or entirely absent the winter is not, as a rule, sufficiently severe to materially reduce the potency of the pest, the adult flies seemingly having little difficulty in living over in sufficient numbers to breed up into a considerable force so soon as the main summer crops come on.

Whilst there is no difficulty in explaining the ascendency of the pest within the Coast belt and Midlands it is no easy matter to account for the maintenance of the fruit fly in many up-country orchards, although it is a notorious fact that the more evergreen shelter there is surrounding or adjacent to an orchard the more abundant the insect is.

According to the latest advices we have seen, Mr. Mally advocates the treatment for a time when food supplies are least abundant, and one cannot do better than quote in full the seasonable note before us. Many fruit-growers, having read through Mr. Mally's remarks which follow, will ask what they are to do considering that they have no citrus trees to attract the fly at the particular time of year when the treatment promises to be most advantageous. In this connection one can only suggest that all susceptible fruit trees should be similarly treated well before the ripening of the fruits, upon the assumption that such trees will be frequented about that time by flies awaiting a suitable conditions of the fruit to pierce it and lay the eggs therein.

Mr. Mally says:—Large numbers of fruit fly maggots, developed in the stone fruits during the summer, have emerged as flies, and are now attacking citrus fruits as they begin to ripen. In several orchards

visited, numbers of the flies could be seen on the trees and many of the ripest oranges had been punctured. Although comparatively few, if any, of the eggs are developing at this time, the puncture in the fruit induces premature ripening and leaves an injury which may seriously affect its keeping qualities. As pointed out by Mr. L. J. Roberts, of "Cottesbrook," near Kroomie, this is especially important in connection with the export trade in citrus fruits, because the punctured spots provide an entrance for the "Blue Mould," which is often the cause of loss in the fruit in storage or in transit. Even though the utmost care is exercised so as not to injure the fruit in picking or handling it, the danger of loss from "Blue Mould" is still an important factor unless the fruit fly is kept under control. Punctures made while the fruit is still of a uniform green colour can be detected by the yellowing of the tissue immediately surrounding them, so that damaged fruits can easily be detected in that stage. But as the fruit ripens, these injured spots are not so easily detected unless they have advanced to the stage where they show as small brownish spots. Punctures made when the fruit is turning yellow in the ordinary course of ripening are so difficult to detect that they cannot be culled out in packing for export. Besides, the mere fact of culling them out means such a heavy loss in otherwise sound fruit that the per cent. of culls is an important item.

Although a certain amount of damage has already been done in the earlier portion of the crop, the bulk of the crop in most localities is still sound and can be protected by prompt action in applying the poisoned bait for the destruction of the flies.

The bait should be made as follows:—

Sugar (cheapest grade)	3 pounds.
Arsenate of Lead	4 ounces.
Water (hot or cold)	5 gallons.

Dissolve the sugar and arsenate of lead in the water and keep well stirred during the application. Apply a light sprinkling of the bait evenly over each tree by means of a common brass garden syringe (20 in. x $1\frac{3}{4}$ in.), using the finest rose. About one syringe full is sufficient for a large tree. The application should be repeated immediately after each rain, at least until the flies have been brought under control. During the fine weather the application need not be repeated so long as the specks of sweet can be seen on the leaves, or about once a fortnight.

There is no danger of poisoning from eating the fruit, nor of destroying honey bees.

Moisture Requirements of Sugar Cane.

THE AMOUNT NEEDED FOR MAXIMUM DEVELOPMENT.

THE Hawaiian sugar planters have probably done more and better work in irrigating sugar cane than any other people. In a bulletin on the subject Mr. J. T. Crawley, the Director of the Cuba "Estacion Central Agronomica," remarks that in Hawaii no one knows exactly the amount of water that is used on a given area of land, for the reason that accurate measurements are not taken; but the approximate quantity is known from the daily capacity of the pumps and of the streams whose waters are utilised and this approximation is sufficiently accurate for general purposes. Where there is an annual rainfall of say 50 inches or less, the engineers estimate that 5,000,000 gallons of water will be sufficient for each acre of land. Now, 5,000,000 gallons per acre is equivalent to 184 inches of rainfall; to this add 50 inches of rainfall and we have a total of 234 inches of water to produce a crop of sugar.

This is often expressed in another way by saying that a pump of a million gallons capacity per day of 24 hours will be sufficient to irrigate 100 acres of cane. As the cane crop is irrigated 15 to 17 months, it will be seen that the formulas above referred to are not very different. Some plantations use more water than the above amounts and many use less, but it is safe to say that the average irrigated plantation in Hawaii uses above 150 inches of water per year, exclusive of rainfall, when this is small. The greater part of the rain falls in the winter time, when the temperature is low and the evaporation small on account of the low temperature, and when the growth of the cane is least. Irrigation is therefore more necessary, and more water is used in the summer when the temperature is high, the growth of the cane rapid, and the evaporation from the soil excessive.

Turning to Cuba, Mr. Crawley remarks that the conditions are quite different in that country, where most of the rain falls in the summer when the temperature is high and the growth of the cane most rapid, and when there is a large amount of evaporation from the soil. "Here, therefore, the rain falls at the time most needed and when it will do the greatest good, whereas in Hawaii it falls at the time when least needed and when it does the least good. The practical consequences are that the growing of cane in Hawaii without irrigation in places where the rainfall does not exceed 50 inches per year is exceedingly uncertain, whereas in Cuba this same amount of rainfall produces a fair crop if well distributed throughout what is called the rainy season.

"It will be seen then that there will not be needed as much irrigation in Cuba as in Hawaii. Cane, however, is a crop that needs a great deal of water, and it needs it regularly. One hundred inches of water, if applied at regular intervals, and in quantities proportional to the necessities of the cane, would probably be sufficient; but, considering the fact, as will be clearly brought out later, that the rainfall comes at very irregular intervals and often in such quantity that a great deal of it is lost either by surface run-off or by seepage, it is probable that at least 125 inches of water, including the rain, will be required for the full development of the cane. The writer is of the opinion that whenever the rainfall is less than 5 inches per month, the cane will suffer, and that during the summer time this should be at least 8 inches well distributed, or the cane will not develop properly. This statement can be only of general application since the nature of the soil, its power to absorb and retain moisture, the character of the subsoil, are all factors that have a material bearing on the subject."

Value of Home Experiments.

PERHAPS one of the things that the average farmer hates most is an experiment. The very mention of it to him seems to convey some idea of inexperience, and for that reason, if for no other, he leaves experimenting alone. And yet how often he could be helping himself! For however good his crops may be looking, there are few which could not be improved a bit, and he is a happy man who possesses all good crops.

In *Farm, Field and Fireside* for July 9th Mr. S. James discusses this subject, and shows what a farmer might do in the direction of advancing his knowledge of his own particular farm and the peculiarities of its soil. For instance, with artificial manures, he recommends that when these are bought, the land should be dressed, in marked portions, with varying quantities, and some part should be left with none. The evidence of one's own eyes would then obviously persuade us whether the particular manure answered buying or not in future. Or if expense

had to be more or less studied, let the experiment be carried out on a small plot with about a hundredweight.

Each farmer has, as a rule, his own particular fancies for these artificial manures; fancying gas lime, nitrate of soda, superphosphate, kainit, basic slag, or, as the case may be, without any consideration as to whether it is the best for the purpose. These, we think it is wise to say, ought certainly to try their theory on a small piece of land first, and, if it is successful, to carry out the principle on a larger scale later on.

If a farmer can be made to see that this or that manure answers to buy (and he does not buy for the pleasure of buying) he will become a purchaser, but he must be convinced about it, and on his own farm. To this end we think that the manufacture of these different manures would be doing well and benefiting themselves if they offered better terms for the sake of experiments being carried on by likely customers, under certain conditions, which could be laid down. Even if the first sample were given free, it should (if the stuff was anything like what was claimed for it) make the user see its advantages and become a regular customer.

When wool will pay all expenses of keep, whatever growth the sheep are making, whatever lambs they are raising, may be counted as profit. If the sheep are worth no more at the close of the year than they were at the beginning, there will be no profit. It is not only important that the flock as a whole should gain in value, but each sheep of the flock should be gaining. It is better to cull at an early age, and not wait until a sheep has lost you money before it is sold.

The General Manager of Railways notifies us that, with effect from August 9th, 1909, South African lucerne, *pressed in bales,* consigned from any N.G.R. Station to Durban in lots of not less than 10 tons, will be conveyed at the No. 11 rate at owner's risk. This rate does not include delivery, and owners will be required to load and off-load the traffic. Consignments of less than 10 tons will be charged at the No. 6, South African produce "C" rate. The special rates for South African lucerne to Durban and Maritzburg at present in force will on and from the above date be cancelled.

Ostrich Farming.

NATAL'S POSSIBILITIES.

LECTURE BY MR. R. W. THORNTON.

The possibilities of ostrich farming in Natal have lately been the subject of much discussion among leading farmers of the Colony as well as in official circles, as a result of the visit of Mr. R. W. Thornton, the Government Agriculturist of the Cape Colony and ostrich expert, who was "borrowed" by Mr. Deane from the Cape Government for the purpose of ascertaining his opinion as to the possibilities of Natal generally in the direction of ostrich farming and the suitability of certain lands in particular for this branch of farming. Mr. Thornton visited Natal in January, and inspected a considerable area of land in the Weenen and Umvoti counties. His report is now in the hands of the Government, and some reference to it, as well as to ostrich farming generally, will be found in our leading article in this issue of the *Journal*.

On the 28th July Mr. Thornton delivered an interesting lecture at Durban, in the course of which he gave his opinion as to the possibilities of Natal in the direction of ostrich farming. The lecture had been arranged by the Durban and Coast Society of Agriculture and Industry, and the chair was taken by Mr. E. W. Evans, the president of the Society. Unfortunately a representative of the *Journal* was unable to be present, but we have made use of the *Natal Mercury's* notes in drawing up the report which follows.

The Chairman, who was received with applause, said perhaps it was advisable, in introducing Mr. Thornton, to offer a few explanatory remarks. There had been few ostriches kept in Natal for the past twenty years, and it was only within the last two or three years that a few men had realised that there were possibilities in ostrich-farming quite undreamed of. Those few men had kept in touch with other parts of South Africa where ostrich-farming had been a pronounced success, and the result of that had been that Mr. Deane, who was always willing to encourage anything that tended for the prosperity of Natal, took an interest in the matter, and he applied to the Cape Colony Government, and they in turn were courteous enough to allow Mr. Thornton, the lecturer that night, to come to Natal for a month and place his services at the disposal of the Natal Government. Mr. Thornton had spent his time in inspecting the land which was thought to

be most suitable for the breeding of ostriches, and he (the chairman) might say, in short, that he had found the spots he had visited suitable beyond his anticipations. The result would be, he hoped, that within a reasonable time they would see, probably under Government auspices, the establishment of ostrich-farming on a small scale, but in a way that would mean success if carried out in the future, and in that respect it would be necessary to follow out closely proper lines on which the farming would have to be conducted. In the Cape Colony, Port Elizabeth was the port where the ostrich feathers were received and distributed, and that industry had contributed in no small part to the prosperity of Port Elizabeth. (Applause.) There they had a large feather hall, where three times a week they held sales throughout the entire year. On behalf of the Durban and Coast Agricultural Society, he (the Chairman) arranged that lecture, in the hope that the Durban people would have acumen enough to see what the town would gain in connection with the establishment of this industry. (Applause.) The welfare of the Colony would be increased by this new industry, and, personally, he was sanguine enough to believe that it was going to be one of the big things of this Colony within the next twenty years. (Applause.) He would call on Mr. Thornton to address the meeting. (Applause.)

Mr. Thornton, in the course of a brief but illuminating address, said he had gone through a portion of the Colony which had been considered as most suitable for ostrich-farming. He started from Weenen, and had been through Impanza, up the Mooi River, and back to Greytown; and he had been as far as Winterton, through to Bergville. The thorn country, along the rivers, was as good, and better, for ostrich-farming than almost any part he had seen in the old Colony—Cape Colony. (Applause.) There were a combination of conditions seldom met with, except on a very small scale, at the Cape—that was, land suitable for lucerne, a permanent water supply, and a suitable climate. In the old Colony they had not always got a water supply on the coast where their land was suitable for lucerne; and where their land was unsuitable for lucerne they frequently had not got the water supply. It was almost impossible for him to estimate the extent of ground capable of carrying ostriches, but there were thousands of acres in the Tuegla Valley suitable, which were capable of growing lucerne. There was a grat deal of land not under water, but which could be put under water, and if it could not be put permanently under water, it could be placed under flood water. In the Old Colony they had to grow a large proportion of their lucerne by means of flood water, and that was precarious. But here they had conditions made for them by nature. They had a permanent supply of water, and the land was good, which meant that they could get their

four or five crops according to the altitude above sea level; and they could work out exactly the number of birds they could run per acre. In the Old Colony they reckoned five birds to each acre, and in Natal they could reckon about the same number, and possibly even more, because the outside veld was excellent, and in addition they had splendid mealie land. Taking 10,000 acres of land, and putting it at four birds to the acre instead of five, and presuming that the birds would bring in £4 a bird, it meant that they would have an income from that land of £160,000 per annum, which was not to be sneered at in these hard times. He had mentioned £4; but it was held in the Cape that a bird was not worth running unless it was going to produce £5 a clipping, and, reckoning three clippings in two years, the return would be £28 an acre. Unfortunately in the Old Colony they had a great number of indifferent birds, but if the industry in Natal were established only the best birds must be produced, and, the industry being a new one, they would have every opportunity of seeing that indifferent birds were not introduced. If Natal once got a good name for feathers, there was no reason why Natal, or Durban, should not take the first place in the feather markets. Applause.) At present the few feathers that were produced here were sent to Port Elizabeth to be sold, but if the industry became established here it would be the buyers that would buy from the producers, by telling them what class of feathers to produce. Proceeding, Mr. Thornton dealt with the type of feather required. The average weekly sales in Port Elizabeth were, in 1903, over £6,000 per week. The income in Cape Colony from the industry in 1865 was £65,726, the weight of the feathers being 17,522 lbs., and that worked out at £3 15s. per lb. In 1875 feathers were exported to the value of £304,933, representing 49,569 lbs., which worked out at £6 5s. per lb., and that constituted a record. In 1888 they had what was known as the "big smash," and prices went down to £1 6s. 8d. per lb. That sum had gradually increased, and in 1904 they exported feathers to the value of £1,058,988, representing 358,370 lbs. of feathers, which worked out at £2 5s. per lb. In 1907 the total number of birds was 455,825. Feathers were exported to the amount of 598,297 lbs., and the value was £1,819,606; the value per lb. being £3 0s. 10d., and the value per bird was £3 9s.

They had been trying in the Cape Colony to improve their birds, but the proportion of bad birds was so great that there was a danger of harming their markets. The market value of common feathers had fallen, owing to a better appreciation on the part of the buying public of the best feathers. If Natal did not legislate, the chances were that the Colony would be a dumping-ground for the bad birds of the Cape. With regard to actual ostrich-farming, the price for a good set of

breeding birds in Cape Colony to-day was about £400—that was, two hens and one cock— and those birds were from birds that money could hardly buy. Six birds from the best strains could be bought for £10 each, and these when fourteen months old would bring in £4 per bird for the first clip, and £5 per bird for the second. For a man with a small farm it would perhaps be better to go in for a number of good chicks. Supposing he bought twenty, it was quite possible he would be able to get six out of them as good as could wish to have for breeding purposes, and the remainder would be first-class clipping birds. It was risky to buy a single set of birds only, for if the cock died the venture would be handicapped. In the Old Colony the greater number of birds were studded, and he advised a similar system being followed in Natal. In Cape Colony a number of farmers went in for allowing the birds to hatch naturally, but those with very good birds preferred the incubating process, which was safer. Having gone into the details of ostrich-rearing, the lecturer said the best method was to allow the young birds to run with the old. In the Cape Colony there was very little labour attached to ostrich-farming, even where hand-feeding was resorted to, two boys being quite able to feed 200 birds, and after the clip all the farmer did was to pack the feathers and send them to the sorter, getting a cheque in return. Allowing birds to run on lucerne saved trouble, and did not cost so much, but one of the greatest disadvantages was that the bird shortened the life of the lucerne, and the want of a change of diet was not in the interests of the birds' health. In Natal, in the parts he had visited, they had the advantage over the Cape in having no great changes of temperature on lands suitable for ostrich-farming, and there was also a better supply of lucerne. In conclusion, Mr. Thornton reiterated the opinion that there was no reason why the ostrich industry should not become better in Natal than in Cape Colony, if taken up on right lines.

Mr. W. G. Baker, as an old Colonist and stock farmer, said he had made trials in the course of his farming experience with ostriches. He cordially supported the starting of ostrich-farming in Natal on a large scale. He was of opinion that under experienced and economical management, and with the selection of suitable ground and districts, ostrich-farming should pay in Natal, mimosa or thorn country being likely to suit best. He suggested the issuing of a prospectus for the formation of an ostrich-farming association, with shares at £5 each, and a nominal capital of £15,000. Suitable land could be got from the Government, with option of purchase.

A number of questions were asked by Messrs. W. G. Baker, M. S. Evans, Harrison, E. L. Acutt, and W. G. Brown.

In reply, Mr. Thornton said that the selection of birds for Natal would be one of the most important considerations. What he would

like was that those who wanted to buy good birds and good chicks should apply through the Natal Government, which in turn would communicate with the Cape Government, and the latter could arrange for the selection. The birds sent would be selected from different strains, and numbered, and instructions could be sent as to grading. Farmers would thus start off on the best possible lines. (Applause.) Prickly pear, though a good food in famine times, should be eradicated, if possible, because there were plenty of other things which an ostrich could be fed on. Still, prickly pear as a food was a good stand-by. The Transvaal at present was getting up breeding birds from Cape Colony. In Cape Colony they could not get good lucerne land under water under £40 per acre, and therefore on land of that description it would not pay to put inferior birds. They should put their best birds on, because the cost of upkeep was just the same as in the case of inferior birds. Common birds were not going to bring in more than £2 10s. a bird a clip; good birds, costing the same in upkeep, brought in double that figure. The 10,000 acres he had referred to in Natal were in the thorn country, all of which could be irrigated. There was a considerable area of dry lands adjoining upon which ostriches would run, but they would feed on the irrigated land. That 10,000 acres was partially Government land and partially privately-owned land. He did not think that the coast would ever prove suitable for ostriches. Cane-feeding for ostriches would do very well, especially in conjunction with lucerne.

To other queries, Mr. Thornton said ostriches acted as splendid gleaners on land which had been used for the growing of oats or other cereals.

A suggestion was made that a committee be appointed to go into the possibilities of ostrich-farming in Natal.

The Chairman pointed out that the Government intended to move in this matter when Mr. Thornton had reported, and would legislate to keep away indifferent birds, and see that the land was broken up into small areas, so that the small settler might have a chance as well as the big man. (Applause.) Within the next two or three months he (Mr. Evans) anticipated important developments.

Mr. Maurice Evans, M.L.A., congratulated the Government on moving in the matter. (Hear, hear.)

Mr. W. G. Brown, in proposing a vote of thanks to the chairman, said Mr. E. W. Evans took a keen interest in all agricultural matters, and he was glad that arrangements had been made for Mr. Thornton to speak on the subject of ostrich-farming. (Applause.)

A complimentary vote to the lecturer closed the successful proceedings.

Science and the Farmer.

NOTES BY FARMING EXPERTS.

ALL heavy and mucky soils are better for being thoroughly drained. If not naturally so, whether tiles should be laid or whether open drains will be effective must be determined by inspection in each particular case.—*George H. Tailyer (Farmers' Bulletin No. 266).*

FLESH-SHEEP.

The important fact in the breeding of sheep, that only the production of flesh and fat, but not that of wool, keeps equal pace with the quantity of food supplied, points out to the breeder that with moderate nourishment the production of wool only, but with rich and abundant nourishment the production of flesh predominates, or is at least equal.—*Alfred Hawkesworth ("Australian Sheep and Wool").*

COMPOSITION OF BUTTER.

Good butter should not contain more than 10 per cent. of water and 0·7 per cent. of curd, but fault cannot be found if the former does not exceed 12 per cent. and the latter 1 per cent. . . . The rancid flavour of bad or stale butter is believed to be owing to the decompositions of the glycerides of the fatty acids which is favoured by water, but checked for a time by salt or borax.—*James C. Morton ("The Dairy").*

MANURES.

The substances which remedy the defects of the soil without enriching it are called mineral manures, *viz.*: lime, chalk, limestone gravel, gypsum, marl and sea-weed. Mineral manures loosen a stiff soil, improve its texture, and quicken its sluggish powers. Mineral manures, especially lime, enter into the substance of certain classes of plants. For instance, lime is found in the grains of wheat, yet it can hardly be said to nourish the growing wheat, any more than the particles of lime which a laying hen picks up can nourish her, though it is necessary to her in forming the egg-shell. Barn is requisite to make dough ferment, yet, though it assists in making good bread, it does not make it more nourishing. By lime farmers mean limestone, or chalk burnt in a kalin; and quicklime means burnt lime before it has lost its caustic or burning power by exposure to the air or moisture.—*Martin Doyle ("Cottage and Dairy Farming").*

Irrigating and Manuring.

He who hopes to sit at ease, and by applying irrigating water, and that alone, to his land, and by so doing to reap continual and rich harvests, will in time discover his blunder. Irrigation, without proper manuring, will quickly render fertile land barren, and convert the poorer lands into sterile and useless districts. Irrigation, with proper manuring, will convert the poorest soil into fertile land; will enable more profit to be made from a very small area than could be made from hundreds of acres without irrigation: and will bring certain harvests and sure profits to an industrious and contented people.—*John McKenzie* (*"Practical Irrigation"*)

Barn Manure.

Applying barn manures is commonly practised for potatoes with profitable results. Lawes & Gilbert showed that only a small portion of the nitrogen of farm manures is taken up by the crop; thus, with an annual manuring of 15·5 tons per acre, containing 200 pounds of nitrogen, continued for twelve years, but 8·3 per cent. of the nitrogen was recovered in the crop. "These results seem to indicate that this crop is able to avail itself of a less proportion of the nitrogen of the manure than any other farm crop. Yet, in ordinary practice, farmyard manure is not only largely relied upon for potatoes, but is often applied in larger quantities for them than for any other crop."—*Samuel Fraser* (*"The Potato"*).

Humus and Its Value.

Humus is a product of the decay of organic substances. When these undergo decomposition in the soil, humus is the intermediate product formed; that is, just before the resolution of the organic material into its component chemical parts. It is probably not too much to say that humus is the most important substance found in any fertile soil, and its presence may generally be taken as the index of fertility. The truth of this statement may be realised more fully when we remember the fact that all barren soils are lacking in the substance, and the chief difference between a barren and a sterile soil is usually a difference in humus content, not in the mineral ingredients.—*H. Harold Hume* (*"Citrus Fruits and their Culture"*).

Feed at regular hours and the fowls will be ready and waiting for their meal.

Natal Bee-Keepers' Association.

W. C. MITCHELL, Hon. Secretary, Cedara.

Correction in last month's notes, page 62, line 12, for $2\frac{3}{4}$, read $3\frac{1}{4}$.

Notice of Meeting.—A general meeting of members will be held on October 13th in a room which the Education Department hopes to be able to place at the disposal of the Association. Members will be advised definitely at a later date. Among other items on the agenda are the following:—(1) Revision of the rules and bye-laws; (2) Receive the report of the sub-committee appointed to deal with the question of affiliating with the South African Bee-Keepers' Association; (3) Discuss the question of legislation dealing with the importation of bees; (4) Consider a proposal to hold an annual show; (5) Discuss the question of marketing honey. The secretary will be unable to send an individual notice to each member. All members are asked to note the date and support the Association by being present at the meeting. The importance of the subjects to be discussed makes the presence of every member who can possibly get to Maritzburg imperative.

* * *

Members are asked to exchange their experiences and opinions through the medium of these pages.

* * *

Colonies that have wintered badly may be assisted by a careful spreading of the brood, *i.e.*, open out the frames containing brood, inserting an empty comb, already drawn out.

* * *

Never give more frames than can be covered by the bees. Insert division board between frames that are covered by the bees and the remainder.

* * *

Give weak colonies frames containing honey from stronger stocks that can spare it. Failing honey they may be assisted by feeding.

* * *

Thoroughly clean bottom boards, and, if not already done, paint your hives in dry weather.

* * *

Look out for swarms.

DISTRICT NOTES,

For the Month Ending August 15th, 1909.

Cedara.—Queens already settling down to some good solid work, many of the hives already containing five and six frames of brood. The cold snap we are just having, however, will probably put a check on brood-rearing for a few days. Bee-keepers will be sorry to hear that in our recent fire ten hives, belonging to students at the School of Agriculture, were completely destroyed. The farm apiary, however, had a lucky escape, although one hive had its side charred with the heat. Luckily this was a weak stock recently brought up from the coast and the frames occupied by the bees were on the cooler side of the hive, which probably saved the combs from being melted. *Itengwas* (starlings?) have been giving some trouble, but after shooting one the rest decamped. Very little pollen is being gathered, but artificial pollen was refused even when dusted on to flowers that were being visited by the bees.

Hilton Road.—Colonies strong: one swarm out; mostly working on gum trees and garden flowers.

Malvern.—Colonies strong and active, but no swarms have so far appeared. Ants troublesome.

New Hanover.—Colonies very strong, but no swarms at date of writing. No pests noticeable. Pollen being gathered principally from chickweed and garden flowers. Bees at work on the gums but not storing surplus.

Camperdown.—General condition of colonies reported to be very good. Strong stocks storing surplus. Red pollen being gathered from wild aloe and mignonette. Mr. J. W. Gavin planted one pound of mignonette seed with eminently satisfactory results.

Glencoe Junction.—Very little of either nectar or pollen being gathered; what is being obtained comes from fruit trees, eucalyptus trees and tulip. The pollen is of a light yellow colour.

Ladysmith.—Some stocks reported as being very good, others only fair, but these were late swarms last season. Red and pale yellow pollen being obtained from aloes and gums; nectar from early gums, aloes and sage bush; this latter is found growing on the river banks, and Mr. Buhr notes that the bees appear to work on it very strongly.

Maritzburg.—Last season has proved an exceptionally bad one for bee-keepers in the City, many not obtaining a drop of honey. A species of wild apricot is reported by Mr. Fuller as swarming with bees. We all wish our brother bee-keepers in Maritzburg a better season this year.

Any bee-keeper who will oblige by sending in monthly notes of the doings of bees in his or her particular district can be supplied with proper forms for filling in by applying to the Apiarist, Cedara.

* * *

Any member of the Association having honey for sale is requested to communicate with the secretary, stating quantity and at the same time forwarding him a small sample.

* * *

Quotation.—"Swarming is the great trouble in modern bee-keeping; it is a bad legacy left us by the old-time skeppists. With the ancient straw hives and the old benighted methods of working, it was all very well. When bee-burning was the custom, and all the heaviest hives were fore-doomed to the sulphur pit, the best bees were those which gave the earliest and the largest swarms. The more stocks there were in the garden the more honey there would be for market. Swarming was encouraged in every possible way. And so, at last, the steady stay-at-home variety of honey-bee became exterminated, and only the inveterate swarmers were kept to carry on the strain." Tickner Edwardes, in "The Bee-Master of Warrilow."

* * *

THE CONTROL OF SWARMING.

Last month a few notes were given on the subject of fitting up the modern frame hive and dealing with any swarms which might occur. Mention was made that in actual practice it might be desirable to discourage swarming, or to obtain a still greater increase of colonies than Nature would provide.

To those who are beginners in the craft I wish to sound a warning note. Do not for one moment yield to ambition, during your first season, at any rate, to increase your apiary artificially. To every successful one there will be a dozen failures. Remember Oettl's golden rule, "Keep all colonies strong." One strong colony will always pay you better than two or three weak ones. For the first season be content with your one or two colonies; give them all the attention you can; watch the bees going in and out; note their behaviour and learn all you can about them; try and find out the reason for everything that you notice being done; some of the workers you will see coming home with loads of pollen on their legs, pollen of all colours, white, yellow and red of varying shades; observe where the bees are collecting this and note what flower produces each coloured pollen.

We want to keep our colonies strong; we know that if a swarm issues from a hive that colony will be considerably weakened; it is therefore

necessary that swarming be prevented if possible. How shall we set about it? Scientific bee-keeping has been aptly described as "knowing what the bees want to do and helping them to do it." We will apply this to the case in point. One of the most fruitful causes of bees swarming is want of room in the hive; the bees cannot increase the size of their habitation so they are driven to decrease the number of its inmates, hence swarming. By forestalling the bees' wants in this direction and giving them more space, swarming can be reduced to a minimum. Where the bee-keeper has several colonies frames of sealed brood may be taken from the strong colonies and given to the weaker ones to help to strengthen them up, substituting in place of the frames removed new frames containing full sheets of worker foundation or drawn-out comb. If only "starters" are given to a strong colony at this time there is danger of having a large number of drone cells built, which should always be discouraged except in selected colonies from which it is desired to procure mates for your virgin queens. Place fresh supers above the brood chamber in advance of the bees' requirements; keep the hive cool by shading and provision of sufficient ventilation. Attention to all these matters tends in the right direction.

In spite of all such precautions it will sometimes happen that a swarm will issue, in which case our only course will be to correct the mishap as far as lies in our power. Proceed as follows:—The hive from which the swarm has issued must be removed from its stand and placed close to its old site with the entrance facing in the opposite direction. On the old site place an empty hive with frames containing full sheets of wired foundation; remove the super from the old hive and place on the new hive; this new hive will then receive the returning bees that have been afield gathering stores; hive the swarm in the new hive as detailed in last month's notes. Now, open the old hive and destroy all queen cells, removing the unsealed broods to give to weak colonies. The sealed brood is then left in the hive, which should be contracted to conserve the warmth. In a few days this brood will have hatched, when the hive should be opened and all the bees brushed or shaken in front of the new hive, the empty combs being preserved for giving to other colonies whenever they may be required.

If the queen that issued with this swarm is an old one, and it is desired to supersede her, one of the cells should be left in the old hive to hatch. When this takes place cage the young queen in an introducing cage and place her among the bees in the new hive, at the same time destroying their queen. In selecting the queen cell which is to be left choose one of the largest, and preferably one which shows some indication of hatching very shortly—either the young queen inside may be heard piping or the cap of the cell may be partly pared off, leaving only a very thin covering.

Farm and Garden Notes for September.

By GEO. CARTER, F.R.H.S.

TOOWOOMBA CANARY GRASS.

THE sub-leader about this grass, and the article reprinted from the *Journal* of the Department of Agriculture, Victoria, will have been read with much interest by all farmers. I notice also an article on the same subject in the *Transvaal Agricultural Journal*, July issue, which is very similar in tone, and giving generally the same cautious conclusions. It is quite right that great caution should be exercised by farmers and others in purchasing new introductions, for many of these turn out to be worthless in actual practice. It is also quite possible that a thing which may be as good as gold in one country will be quite worthless in another; but, on the other hand, it is true most of the better class grasses, for instance, which are now doing very well indeed, have been introduced into South Africa by private enterprise on the part of some farmer, and there is no monopoly of wisdom in Government experts. Paspalum, the most valuable grass we have for most purposes, was introduced by a farmer, and one might mention many other items of interest of the same kind. I mention this point because I think the extreme caution exhibited with regard to this phalaris is not justified. The results of last year's trials, especially the results of the winter trials all over the high veld, have been far more satisfactory than our Government officials have any idea of, and I cannot but feel, from my close knowledge of the conditions under which the many trials were made, and of the great variance in climate and elevation under which the trials have been made, that the experimental stage is past. We have yet a good deal to learn about this grass, perhaps, but, this much we know, that in Toowoomba Canary Grass we have now a grass which will stand all the cold we have in South Africa; which is a tremendous yielder; which comes out exceedingly well in comparative analysis; which is perennial; and which is just as good in the midlands, and even on the coast, as it is higher up. I do not make this assertion on guess work, but after careful enquiries and investigations in the different districts; and I have particularly delayed saying this until now, because I wanted the trial of the full winter's cold to be completed. In answers to many enquiries I find that in such widely-separated districts as New Hanover, Lehlononi (East Griqualand), Polela, Highlands, Vryheid, Ermelo, Bethlehem, and Harrismith the reports exactly agree, most of the farmers

reporting going so far as to say that it will certainly be the winter grazing of the future all over the colder districts. The only failures reported are from European seed, which, of course, is not the Toowoomba Canary Grass. The Hon. Mr. Oliff tells me that it has done very well indeed at his Harrismith farm. The Director of Settlements, O.R.C., is so well satisfied with his recent inspection of the grass in the whole of the eastern part of the O.R.C. that seed is to be issued to all the settlers this spring. Plants two years old at Mr. McFie's midlands farm show not the least signs of failure. What more do we require in the experimental line. I have been enthusiastic from the first time I saw the grass, and now, after two years' experience of it, I feel as enthusiastic as ever, and long for the time to come when seed can be produced cheaply and in quantity, so that all farmers will be able to sow it largely.

The only objection I have heard at all is that this grass requires good land, and cultivation just at the beginning. But surely this cannot be looked upon as an objection worth mentioning. Are our farmers looking for a sort of terrestrial paradise, where any sort of grass will grow without any trouble or expense? If so, they are doomed to disappointment all along the line. I must point out once again that a crop of good grass is worth 50 per cent. more than a crop of mealies; that grass is by far the most valuable crop which this world grows; and that it is well worth good land, good manuring, and the very best care and attention. I can never understand how it is that, while all farmers are perfectly willing to manure a crop of mealies heavily, there is such a decided reluctance to spend a few shillings on manures for grass lands. Only in a very few cases have I seen this point really appreciated and applied in a business-like manner. To most farmers a pasture must be a crop which will grow spontaneously on the poorest land—land unfit for any other crop—or he will not consider it at all. If you have been looking upon it in this light, I challenge you to sit down quietly and make a careful comparison of values between an acre of mealies and an acre of good grass, and you will be astonished at the result. Take the results of this last winter in milk, or butter, or increase in sheep, in wool, and work it out on a business basis. We must look upon pasture grasses as a business proposition, not a something which is simply very nice to have during the winter months. If we look at phalaris in this light, this one objection falls to the ground, for it is well worth all the work it will give.

HELIANTI.

A good many enquiries have reached me recently about this "new" fodder plant. A circular has reached us during the last few days from the seedsman who is advertising and pushing this (Mr. Chas. W.

Marsters, of King's Lynn), and a few will be obtained for trial as soon as possible from him. Upon reading through the circular, which gives a fairly full description of the plant, I cannot but think Helianti is suspiciously like our old friend the Jerusalem Artichoke. But before saying more about it I will have it out here and report to readers who are interested in it at a later date.

HAWKSTONE OATS.

Mr. T. H. Hindle, of Willow Grange, again reports that his crop of this Oat has been entirely free from rust, and has done very well indeed. From what I have seen and heard of it there seems to be a good deal in its favour. There is no need to tell any farmer how great a value there is in the rust-resisting property of any Oat. So far the Algerian has been the only variety fairly free from this pest, and in many cases even it has been badly attacked. The "Hawkstone" takes about three and a half months to mature, is a somewhat heavier yielder than the old Cape, with an equally good head and straw, and a really beautiful forage when well reaped. Mr. Hindle, who has named this Oat after his own farm, got the first seed quite by accident, in a lot of imported Rye seed, some eight years ago. It was noticed that, while the Rye was so badly infested with rust as to be absolutely valueless, a few Oat plants in the crop were quite free and healthy. These few Oat plants were carefully reaped by hand, and in time planted again. Since then the variety has been planted at all times of the year, and in no case has rust appeared in any part of the crop. Some of our readers probably saw the resultant forage on the last Durban show, where Mr. Hindle won the "special" with a five-bale lot. This is worth watching and testing in other parts of the Colony.

THE VEGETABLE GARDEN.

The very cold snap of the middle of August, as unexpected as it was severe, will have played sad havoc with the earliest outside sowings of the more tender plants, such as Marrows, Cucumbers, and Tomatoes. It is always risky to get these up in August, but we will sow, for there is just a chance of no more frost, and these things are so very nice if we do succeed. Even the Potatoes planted at the end of July, which were just out of the ground, were very badly bitten, although these will probably recover. The wise gardener has generally a little reserve lot of such things as Tomatoes kept for such an emergency as this. This reserve must be put out now, and will probably be quite safe this time.

Full sowings of all kinds of vegetables may be made this month, particular attention being paid to those varieties which will only grow well in the summer. These will include Sugar Corn, Tomatoes, Mar-

rows, Cucumbers, and Beans. Runner Beans, which are far more delicate than the dwarf variety, should be delayed until the middle of September in the colder districts, but are now safe in the midlands. The first early cabbage, Wakefield, will be ready for transplanting. A fresh sowing of the summer varieties, Cape Sugar Loaf and Enfield Market, should be put in. The last transplanting of Onions sown in the autumn must now be done.

MUSK MELON.

Everybody desires to grow this delicious fruit, and it is tried in all sorts of unlikely places every spring. There is always much disappointment. Gardeners should remember that our Natal climate is not suitable, generally speaking, for Melon culture. Only in a very few places can it be grown, and even there only with great care.

The soil which is suitable is a rich, deep, sandy loam. Melons will not do at all in heavy clay soil. The exposure, also, must be the most sunny one available. Judging from many reports, I think that the most likely districts for Melons are those which we call "thorn" districts, such places as Muden and Weenen, which are below the mist belt, and which have a somewhat low rainfall in the summer. The one place in South Africa where they are really successful is the Western Province of the Cape Colony, where the heavy rains are during the winter, while the summer is comparatively dry and warm. Seeds are sown in hills slightly raised above the surrounding soil, in the same manner as Marrows, the "hills" being about six feet apart each way. Three plants are allowed to remain in each "hill." Terminal buds are to be nipped off, to encourage the growth of laterals, as most of the fruit is produced on the laterals. The ripening of the fruit is indicated chiefly by the scent, and also by the cracking and easy parting of the stem.

THE FLOWER GARDEN.

Dahlias should now be divided up as fast as growth shows, and the single tubers planted in the summer bed, four feet apart each way, a strong stake being placed at the same time with each tuber. Plenty of old and rotten manure should have been put into the ground just before planting. Beware of new manure in this case, as it will produce lots of foliage and stem at the expense of flowers. Those who desire to have extra good blooms this summer must remember that one cannot obtain both a large number of flowers and perfect specimens at the same time. Stems should be limited in number to two, in the first place, these being carefully and securely tied to the stake as they develop, and when the buds show they should be thinned out to about eight on the one plant. An occasional application of liquid manure will be found very beneficial at the "bud" stage and later. Most growers, however, prefer a great mass of bloom to a few very choice

ones, for after all the Dahlia is more adapted for garden decoration than for cutting.

I am afraid that many people are disappointed at the result from seed. It is true that just occasionally a good type may be obtained in this way, but one might almost say that it is impossible for the amateur gardener to succeed from seed. Only in places where it is impossible to get bulbs should seed be sown, and there the best results will be obtained from the little "Pompon" class. The wisest plan is to get a few good bulbs of named varieties from the nurseryman, for these will always give satisfaction. In choosing varieties consider whether you require them for specimen blooms or for garden decoration, for some of the very best of the show blooms are borne on short stems, almost hidden in foliage, and are of no use for decoration. For a blaze of colour nothing is better than the Pompon class. Amongst the newer Cactus varieties I like Delicatissima the best of all, for colour and free blooming, although the shape of the petals is not all that could be desired. Quite a new class, the Poeony flowered, is very popular in England just now, and these should be available this year in Natal.

September is quite the best month for bedding out Salvias, Ivy-leaved Pelargoniums, etc. These will bloom right along until the frost time, and should have as long a season as possible. Seeds of all the more tender annuals may be sown now.

Chrysanthemum cuttings may be taken all through this month, as they become large enough for the purpose. As the young plants get well rooted and strong old plants should be rooted out.

We have received from Messrs. Brinkworth & Sons, the well-known firm of potato raisers and experts, of Southampton, England, a copy of their latest catalogue. Messrs. Brinkworth & Sons make potato-growing for export a speciality, and their productions are consequently of particular interest to the South African farmer. In this connection we notice that they pay freight and insurance to Capetown, East London, Port Elizabeth, Durban and Delagoa Bay for orders of 20 cases and upwards. The catalogue includes the names of a considerable number of new and popular potatoes—over fifty altogether—and descriptions of "the twelve best potatoes in the world" are also given. Messrs. Brinkworth will probably be pleased to send a copy of the catalogue to anyone interested.

The Position of East Coast Fever.

LIST OF OUTBREAKS DURING JULY-AUGUST.

THE Chief of the Veterinary Division (Mr. W. M. Power) furnishes the following list of outbreaks of East Coast Fever that have occurred during the period 21st July to 20th August:—

Dundee District.—Outbreak on farm "Tiger Kloof."

Weenen District.—Outbreak on farms "Blinkwater" and "Krantzkop."

Umvoti District.—Outbreaks on farms "Pinedale," Mr. T. Dawson's portion of "Weltevreden," "Bellevue," "Petrus Vlei," "Fairfield," and "Chailey," sub-division of "Wondeboom."

Klip River District.—Outbreak on farms "Hond Klip," sub-division of "Elands Laagte," west of main line, and "Driefontein," east of main line.

Krantzkop District.—Outbreaks on farms "Glen Erskine," "Wonderfontein," "Scotsdale," and "Overschot."

Umgeni District.—Outbreaks on farms "Thorney Bush," sub-division of "Ockertskraal," "Allandale," "Rosedale," "Ambleton," "Garwin," "Binchester Grange," "Settle," and "Lilliefontein."

Lion's River District.—Outbreak on farms "Linwood," sub-division of "Ashby," west of main line, "Lyndoch," west of main line, "Breezy," west of main line, "Fountaindale," sub-division of "Eockeogat," east of main line, "Horbl," T. Hyslop's cattle on "Groote Vallei," west of main line, and amongst Government oxen on "Cedara," west of main line.

New Hanover District.—Outbreaks amongst Natives' cattle on farm "Zeekoehoek," and on farms "Klein Waterfall," "Sproxton," "Carthorpe," "Dornkop," W. H. Westbrook's portion of "Camel Hoek," "Impolweni Mission Station," "Moe's Rest" sub-division of "Wilgespruit," "Riverside" sub-division of "Camel Hoek," "Lilienthal" sub-division of "Dalton," E. Boast's cattle, York, "Boilingfontein," "New Hanover" sub-division of "Welverdient," and "Ambleside."

Camperdown District.—Outbreaks on farms Thornville Junction of "Lilliefontein," and Cato Estate sub-division of "Reit Valley."

Upper Umkomanzi District.—Outbreak on farm "Brasfort Park."

Ixopo District.—Outbreaks on farms "Philpots Estate," "Doornvlatge," "Zondag Kloof," "Vaalkrans," "G. D.," "Smithfield," "Herdstown" sub-division of "Cothill," and "Inhlamveni."

Lower Umzimkulu District.—Outbreak on Elim Mission Station.

No record is kept of outbreaks in the following Magisterial Divisions: The whole of the Province of Zululand, the whole of Victoria County, Umsinga, Vryheid, Ngotshe, Babanango, and Paulpietersburg.

A Mealie-Husking Peg.

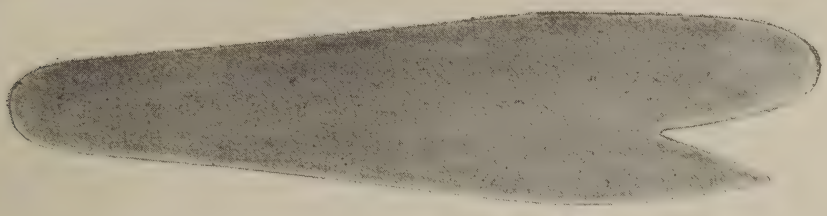
A USEFUL IDEA.

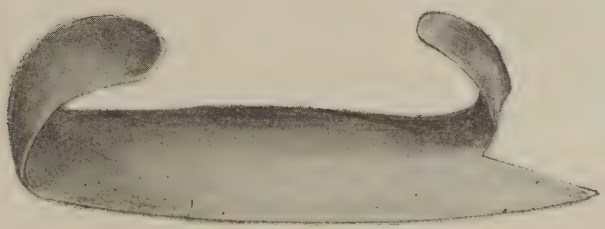
THE illustrations which we print herewith will, we think, prove of interest to most of our readers—in fact, to all who are growers, in however small a way, of mealies for grain.

The first of these illustrations we have drawn from an unfinished and a finished husking peg which has been designed by Mr. W. Mapstone, who needs no introduction to readers of this journal. Mr. W. Mapstone called at our office recently and kindly left us samples of his husking peg, which he thought would be of interest to our readers. The peg is made of hoop-iron, cut to the shape shown on the top in the first illustration. The longest length is 6⅛ inches, and the width in the broadest part 1½ inches. The piece of iron, after having been cut to this shape and the edges trimmed with a file, is next bent as shown at the bottom in the same illustration, and the peg is ready for use. As will be seen, it is simple in construction, and so within the sphere of any farmer's abilities; and at the same time it is strong and effective.

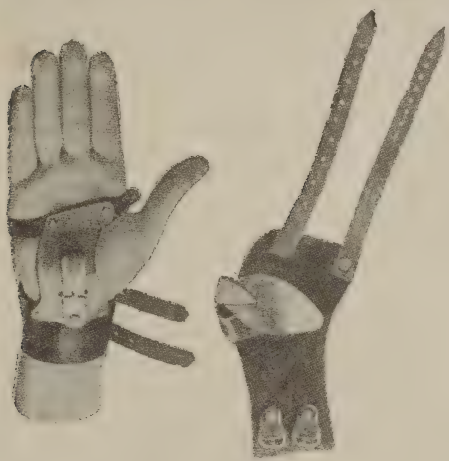
The husking peg is held in the right hand, the curved portions going over the fore-finger and little finger respectively to the back of the hand. Held thus, the point appears a little above the forefinger and opposite the thumb, which is used in conjunction with it in grasping and jerking off the husks from the mealie-cobs, the point of the pegs, of course, being inserted through the husks, at the top of the cob, and half the husks pulled off at a time with a downward jerk.

We depict other forms of husking pegs and hooks in the other two illustrations (which we have taken from a United States publication—U.S. Department of Agriculture, Farmers' Bulletin No. 313), but it will be seen that Mr. Mapstone's husking peg is much to be preferred —at least in a hot climate like ours, where the use of gloves would be most uncomfortable. Mr. Mapstone's peg is also evidently cheaper.

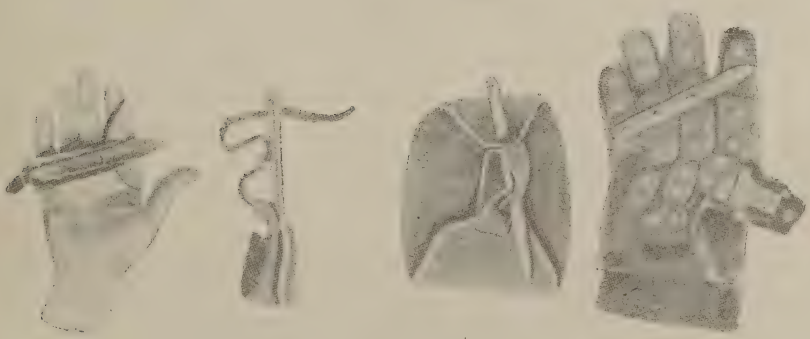




MR. MAPSTONE'S HUSKING PEG.



HUSKING HOOKS.



SPECIMENS OF AMERICAN HUSKING PEGS.

Exchange Reviews.

"The Cape Garden."

SOME two years ago a pamphlet on gardening entitled the "Cape Peninsula Amateur Gardener" was published by the Suburban Amateur and the Sea Point Horticultural Societies. This pamphlet proved of great assistance to a large number of persons, and the circulation steadily increased. Its discontinuance after a successful year was greatly deplored. The Sea Point Horticultural Society, feeling that the publication is necessary, has decided to undertake the responsibility of starting afresh and their endeavours have resulted in the issue of a monthly magazine, the first number of which has reached us. We hope that their enterprise will receive the support of all who have the interests of horticulture at heart. The small sum of 3s. 6d. per annum will secure to the subscriber the monthly receipt of not only a calendar of hints for the month's work, but also news of the current work in the horticultural world and general information on plants and flowers most generally grown.

Manuring of Fruit Trees.

The *Cape Garden* (to the inception of which we refer in the preceding note) contains a useful article on the "Manuring of Fruit Trees." There is a notion that fruit trees do not require manure, which no doubt is due to the fact that many, even without any special manuring, occasionally give good yields. Furthermore, many believe that a fruit tree which has borne well one year cannot give any yield the next or even the following year, because, as some say, it needs rest. To show that neither of these opinions are correct, it need simply be stated that the fruit tree is subject to the same laws, as regards its nourishment, as any other plant. When the nutrients which are present to a limited extent in the soil have been used up, they must be restored to the soil, *i.e.*, the soil must be manured. The reason why a tree which has yielded well one year generally bears very little or not at all the next year is also capable of a simple explanation, namely, that the necessary assimilable plant food is no longer available in the soil, and the tree cannot again form fruit until the soil is rendered able to supply the food.

A fruit tree requires warmth, sunlight, and moisture as well as a number of other substances, which are taken partly from the air through the leaves and partly from the soil by means of the roots.

These substances are all indispensable to the prosperity of the fruit tree, and if one of them is entirely wanting the tree cannot possibly thrive. If one or more of these substances are present to only a limited extent the tree cannot take up the other nutrients—even if they are present in the soil—in quantities sufficient for their complete development. Thus it is that the yielding capabilities of a tree are regulated by that nutrient which is least present and available in the soil.

Gypsum as a Manure.

Bulletin No. 5, 1908, of the Colorado Agricultural Experiment Station contains the results of pot experiments, conducted by T. Takeuchi, with peas, beans, oats, rice, and spinach in which gypsum was used in connection with ammonium sulphate, sodium nitrate, lime nitrogen, potassium sulphate, and different forms of phosphoric acid.

It was observed that as a rule gypsum decreased the yield when used in connection with acid fertilisers and increased the yield when used with alkaline fertilisers. Gypsum, therefore, appears to be a valuable addition to fertilisers which contain sodium nitrate or other substances which produce an alkaline reaction in the soil. If, however acid fertilisers, such as superphosphate and ammonium sulphate, are employed, gypsum is likely to decrease the yield. It was also found in these experiments that gypsum exerts a favourable influence in overcoming the injurious effect on plants of an excess of magnesia in the soil. In the case of spinach it was observed that applications of carbonate of lime were injurious while the gypsum was beneficial, provided the reaction of soil on fertiliser was not acid.

Sugar from Maize Stalks.

An interesting and suggestive article, on "Some Structural Peculiarities of Maize, and how they are related to the development and practical extraction of the sugar under the new treatment," is contributed to the *Louisiana Planter and Sugar Manufacturer* by Professor F. L. Stewart. Prof. Stewart commences by showing the resemblances and differences between maize, sugar cane, and the bamboo—"a triplet of gigantic grasses," as he terms them—and then proceeds to point out the special conditions under which maize increases its sugar content. Both maize and sugar cane are so constituted structurally and functionally, we learn, as to enable them to form and store away the food materials upon which their continued growth and existence depend. This they do in obedience to the same inexorable law and for the same purpose which leads the bee to store up honey within the cells of its hive. "Every physiologist recognises that there is con-

stantly resident within the living organism—the plant as well as the animal—an intelligent, administrative, directive energy, or source of energy, which adequately provides not only for its present, but also for its future probable needs. Not only so, but it is on the alert to meet emergencies when they come, and it has the prevision to anticipate and provide for extraordinary contingencies, and to repair accidental injuries, and particularly to remove or overcome any hindrances in the plant to its own self-perpetuation."

The supreme crisis of its life comes to the maize plant when the immature ear is removed or destroyed. Promptly in that case, and heroically as we would say, if we think of it as an intelligent creation, an effort is organised to meet the emergency, to repair the loss, and to avert the impending catastrophe. To this end a reserve force which never in the ordinary life cycle of the plant has any such demand made upon it is then called into action. In brief, the result is that the plant at once enters upon an entirely new condition of development, and its efforts are rewarded with an indefinite prolongation of its life, with the purpose plainly of maturing a new ear; fresh stores of the precious food materials are produced with amazing rapidity and rushed into the natural receptacles provided for them within the stalk, until the sugar has accumulated to beyond one hundred per cent. more than it originally contained. "It is scarcely necessary to say that this transformation is brought about effectively only under intelligent human control, directed closely to the end in view. The results in sugar accumulation are then as uniform and constant as in the sugar cane in the tropics."

The same machinery, it appears, cannot be used for maize-crushing as for sugar cane-crushing, owing to differences in the anatomical structure of the two plants. It is found, however, that combined with a crusher, a triplet of three roll mills, or, better still, a combined twelve roll mill, with about twenty-five per cent. maceration and the speed of the rolls perfectly regulated, can extract ninety-five per cent. of the total juice with much less expenditure of driving power than is used in eighty per cent. extraction from the southern cane. This is due largely to the fact that the silicious hardening of the stalk of maize does not begin until its growth is completed, or, in this case, until the period of saccharine development has passed; and also to the fact that the rind or outer shell of dry woody fibre which encloses the juice-bearing cells of the sugar cane is much thinner and much less dense in corn-cane. Hence it will readily be seen that in the latter case the hindrances to perfect extraction are much less than in the former.

Equally important with the sugar is the pulp and cellulose product, consisting of the *substance* of the *whole stalk* in a highly purified condition, after the sugar has been extracted, the whole of it ready to be resolved at once into the finest quality of pulp and cellulose. On account of the *absence,* in this case, of the *hard silicious coating which covers the cornstalk* when the grain has *ripened* and which prevents the best of the fibrous matter which it contains from being utilised, the pulp obtained is *doubled* in *quantity* and is of a much *superior quality.* "A necessary incident to the sugar process," Prof. Stewart concludes, "is the removal of the immature ears and husks from the stalk. This field stuff amounts to about eighty per cent. of the weight of the stalk, and adds a third class of products obtained from the same plant, utilised principally in the manufacture of food products and alcohol."

Saddle and Harness Horses.

Mr. P. R. Gordon compares the type of saddle and harness horses, in the *Queensland Country Life,* June issue. As he states, many people are of opinion that a perfect saddle and perfect harness horse may be combined in one and the same animal. Many horses, it is true, he remarks, represent a combination of the two, but, as has been pointed out by a well-known English authority, perfect riding horse shape and perfect harness shape cannot be combined in the same animal, as they are antagonistic in some important details. To begin with, a short back, which constitutes an indication of strength, is desirable in both types; but, while this qualification is an indispensable requirement in the riding horse, it is not of nearly so much importance in the harness horse. Closely-knit loins are a necessity as indicating their weight-carrying capacity, as all will agree a slack-loined horse cannot stay under a heavy weight. In the harness horse what, in the language of the stable, is called close coupling is not an indispensable necessity, and in some of the best harness horses there is often a tendency to slackness of loins or loose coupling.

In the matter of quarters, there is often a marked difference in the combination of the two. Those of the riding horse are lengthy, and what, in stable parlance, is termed "reachy," and the more that is so the better. There are two distinct types of light harness horses, namely, the buggy and the coacher. In the former the type is cobby and compact in shape and comparatively short, while the latter type have long and roomy quarters, and are further characterised by the croup being very level and long. It is in the fore quarters that the greatest difference exists between the saddle and the harness horse. In the hack type the shoulders are as sloping as possible, the shoulder

blades possessing great length, well laid back at the withers, all of which combine to give lightness of forehand and roominess in front of the saddle and ensure easy action in all places. The shoulders in a typical harness horse, on the other hand, are more or less heavy, as compared with the hack, and less sloping. They are broader, affording plenty of space to bear against the collar, thus naturally tending to make them heavy from a riding point of view. Although sloping shoulder-blades are desirable in both types, the fact of being comparatively upright may be condoned in the harness type, and does not constitute nearly so serious a defect as in the riding horse, their principal drawback involving poor action. A horse with a straight shoulder can neither canter, gallop, nor jump well, and in the riding horse results in the saddle being carried too far forward.

Then in the breast the two types differ much. In the harness type it is broader than in the riding type. Broadness of chest adds much to a horse's power of draught. Breadth of chest naturally involves a greater width between the forelegs than is desirable in the hackneys. Horses which are comparatively wide between the forelegs roll more or less while in action. That defect, serious in the saddle, is no drawback in harness. And it is necessary that the harness horse should be somewhat heavy in front to throw plenty of weight into the collar. In the riding horse the forehand must necessarily be light. Any tendency to heaviness in front constitutes a very grave defect in a horse used for saddle purposes. And, lastly, the neck. In this the saddle and the harness types differ considerably. In the latter the neck is broad and comparatively short and thick, and from a riding point of view is too heavy. In the saddle horse type the neck is lengthy and lighter, and more supple in shape. It is essential that the saddle horse should possess a lengthy neck, and that it may bend properly to the rein. Taking the forehand as a whole, that part is comparatively heavy in the harness horse type, the heaviness being due partly to the neck and shoulders, and partly to the broad chest.

Vegetable Ash as a Manure.

Mr. W. Guerrero, in a recent issue of the *Chemical Trade Journal*, calls attention to the beneficial effect of applications of ashes both as a direct source of plant food and as a means of rendering other fertilising materials more available. The extensive use of ashes on the Continent of Europe is illustrated by the fact that 22,000 to 24,000 tons of ashes are used annually in the olive industry alone.

Disc-Harrowing Lucerne.

Mr. R. H. Forbes, in Bulletin No. 57 of the Arizona Agricultural Experiment Station, enumerates the principal benefits of disking lucerne as splitting and spreading the crowns, thereby causing new growth, destroying the egg deposits and larvæ of injurious insects, destroying weeds, and breaking up dense soils, and especially the silt-blanket deposited by muddy irrigation water. It is estimated that disking will increase the average crop in Arizona 10 to 20 per cent.

Observations were made on the reduction of the yield resulting from the silt-blankets, which are often 3 to 4 inches thick. A field near Yuma showed a depreciation of 6·3 per cent. in the second cutting, one near Phœnix of 9·7 per cent. in the third cutting, and one near Solomonville of 27·6 per cent. in the second cutting.

Composition of Fresh Avocado Fruit.

According to the analytical data presented by Mr. E. A. Patrault, in the *Bulletin Assoc. Chim. Sucr. et Distill.*, the edible portion of the avocado has the following percentage composition: Water 82·1, protein 1·2, fat 8·7, sugar 2·9, cellulose and undetermined material 4·6, and ash 0·5 per cent. Starch and tannin were not present. The fat, it is stated, is a green aromatic oil with an odour recalling that of laurel oil, which solidifies at 15 per cent. C. The sugar present was not completely identified. It reduced Schling's solution, and hence is not the same as that which has been identified in the avocado seed.

Fertility in Scottish Sheep.

A series of statistics, based upon inquiries made by sheep-breeders, was compiled by Mr. F. H. A. Marshall, in a recent issue of *Trans. Highland and Agr. Soc., Scotland*, for the purpose of showing some of the principles involved in determining fertility in sheep. The percentage of lambs per 100 ewes and the percentage of barren ewes in various flocks of different breeds and kept under different conditions are shown in tabular form. It was found that certain changes of weather during the breeding season may have an unfavourable effect upon the percentage of lambs, and that the practice of flushing ewes almost invariably has the effect of increasing the percentage of twin lambs and triplets. Considerable evidence was obtained to show that a high fertility is ordinarily hereditary.

Supplements to Maize for Fattening Hogs.

Bulletin No. 126 of the Indiana Agricultural Experiment Station contains the results of a comparison, by Messrs. J. H. Skinner and W.

H. Cochel, of tankage, linseed meal, and soy-bean meal as supplements to mealie meal for fattening hogs. The tests were conducted at different seasons of the year with hogs of various ages and conditions of finish. The results are shown in the following table:—

COMPARISON OF TANKAGE, LINSEED MEAL, AND SOY BEANS AS SUPPLEMENTS TO MEALIES FOR FATTENING HOGS.

	Ratio of supplementary ration to basal ration. (mealie meal).	Number of days fed.	Number of Pigs.	Daily gain per head.	Amount of feed per pound gain.	Cost per pound gain.
Experiment 1 :				lbs.	lbs.	*Pence.*
Period 1—						
Lot 1 ...	Tankage 1 : 10 ...	35	8	1·57	3·58	1·84
Lot 2 ...	Linseed meal 2 : 10 ...	35	8	1·48	3·82	1·94
Period 2—						
Lot 1 ...	Tankage 1 : 10 ...	48	8	1·60	4·33	2·17
Lot 2 ...	Linseed meal 2 : 10 ...	48	8	1·36	4·68	2·34
Experiment 2 :						
Period 1—						
Lot 1 ...	Tankage 1 : 36 ...	30	9	1·65	3·76	1·81
Lot 2 ...	Linseed meal 1 : 8 ...	30	10	1·42	3·86	1·88
Period 2—						
Lot 1 ...	Tankage 1 : 32 ...	21	9	1·12	4·00	1·86
Lot 2 ...	Linseed meal 1 : 16 ...	21	10	1·20	3·79	1·77
Experiment 3 :						
Lot 1 ...	Tankage 1 : 20 ...	29	7	1·53	3·75	1·88
Lot 2 ...	Linseed meal 1 : 10 ...	29	7	1·38	4·22	2·01
Experiment 4 :						
Lot 1 ...	Tankage 1 : 15 ...	60	5	1·83	3·83	1·85
Lot 2 ...	Linseed meal 1 : 8 ...	60	5	1·75	3·75	1·81
Experiment 5 :						
Lot 1 ...	Linseed meal 1 : 5 ...	39	4	1·23	3·82	1·91
Lot 2 ...	Soy-bean meal 1 : 5 ...	39	4	1·33	3·46	1·73
Experiment 6 :						
Lot 1 ...	Linseed meal 1 : 8 ...	60	5	1·75	3·75	1·81
Lot 2 ...	Soy-bean meal 1 : 7 ...	60	5	1·82	3·68	1·79
Summary of Experiments 1, 2, 3 and 4	Tankage	...	...	1·61	...	1·91
	Linseed	...	...	1·49	...	1·98
Summary of Experiments 5 and 6 ...	Linseed meal ...	...	...	1·48	3·78	1·85
	Soy-bean meal ...	...	...	1·56	3·60	1·77

In the first period of the first experiment 5 parts of middlings were added to the ration. It is concluded that the tests with soy-bean meal indicate that it is possible to grow in Indiana a feed which is equal in value to linseed meal as a supplement to maize for fattening growing hogs in a dry lot. Mealies should be the basis of all rations for fattening hogs, but a larger proportion may be used with tankage than when linseed meal is used as a supplement. With tankage the hogs consumed more feed, made a more rapid gain, and were better finished than when linseed meal was used. Soy-bean meal proved to be a more efficient supplement than linseed meal both as regards the rate and cost of grain.

Among the Farmers.

THE ASSOCIATIONS DURING THE MONTH.

*** *The attention of secretaries of agricultural societies and similar bodies is drawn to this section of the* Journal, *which has for its object the publication of reports of farmers' meetings, annual reports, presidential addresses, etc.; and it is hoped that full use will be made of the facilities here offered for the dissemination of news regarding such doings of the many associations all over the Colony as are likely to prove of general interest to readers of the* Journal. *In forwarding copies of presidents' reports, etc., correspondents are respectfully requested to make sure that they give the date of the meeting on the occasion of which the address was delivered or report read.*

BOSTON.

The Chairman of the Boston Farmers' Association (Mr. Thos. Fleming, J.P.), read the following report on the occasion of the annual meeting of the Association:—

"Gentlemen,—I now present the 19th Annual Report.

"During the past year it has not been found necessary to meet often, as the holding of stock sales has been discontinued in the meantime. I regret that it has not been found possible to have had a sale of stock (other than cattle) and produce, and I again throw out the suggestion for your consideration.

The Past Season.

"On the whole we have had a good season, and stock of all kinds has done well. The mealie area continues to increase, but the rains were too heavy, and too late, to ensure heavy crops. The native, as usual, has not enough to meet his own requirements. If the phosphate discoveries prove really good, and if the fertiliser can be procured at about half the cost of the imported article, then mealie-growing will pay quite well in many places where they cannot now be grown profitably, but we cannot compete with other parts of the Colony more adapted for the growth of this cereal. Potatoes have been more extensively grown, but the crop has proved light, from blight and excessive rains. Turnips and swedes have been a great success. Fruit has also done well.

"Jackals have played havoc among some flocks, and I regret to say that they are still in the district. As you are aware, the Government

discontinued granting rewards for skins, but I hope some concerted plan will be adopted for the eradication of this pest.

"Two public meetings were held under the auspices of the Association. These were for the purpose of hearing our members and others discuss the question of Closer Union.

"Your delegates attended the Annual Conference of the Natal Agricultural Union, and voted according to your instructions. Many resolutions not on the published agenda were, however, discussed. A number of these were of far more importance than many considered by the Associations, and some bar should be placed on the wholesale introduction of fresh resolutions.

ROADS.

"Those of us who live within easy distance of Elandskop Station have little, or shortly will have little, to complain of with regard to roads in *fine* weather, but many farmers suffer great hardship from the want of decent roads to some stations, and in the more outlying portions of Impendhle Division. We, however, require roads that we can use all the year round, especially now that the work must be done by horses, mules, and donkeys, none of which can touch the ox for patient and plodding endurance on roads deep with mud. It is quite useless for us to expect Government to construct a branch line to Impendhle at the present time, but we should never cease urging that a good, hard road be made into the heart of our Division. This could be used for traction, mule transport, and carriages, and would, in my opinion, serve the purposes of the Division much better than a narrow gauge railway. The railway stations should all have hardened roads to them. A great impetus would thus be given to the raising of produce for market, and the railways would pay better.

EAST COAST FEVER.

"I now come to this plague, which is undoubtedly the reason why Natal is not more speedily recovering from the painful period of depression. I am thankful to say that Impendhle Division has, so far, been spared this visitation, but the question is, "Is it possible for it to continue a clean area?" I am very hopeful, but we must fight, and to do that, money is needed. The Board in this portion of the Division has conducted everything with the greatest economy, but the time has come when more must be done by every farmer, both in the way of supplying the sinews of war, and in carrying out, and in seeing that others carry out, East Coast Fever Regulations. I regret that in some cases, while the letter of the law is respected, the spirit is not regarded. Gentlemen, I cannot too strongly urge upon you to put up with inconvenience and losses for the general good of the community. Depend

upon it, you will not lose in the long run. The disease is very near our borders, in Umgeni and Lion's River Divisions, and it is bound to come closer, at anyrate in the Zwaartkop Location.

"Movement of cattle throughout the Colony has now been stopped, and wisely so, but, to prevent straying, fencing is absolutely indispensable. Let me again urge all owners of cattle to take up the next weapon, and destroy the tick. Dipping is almost entirely neglected here, although it is unquestionable that by reducing the number of ticks, risk of the disease spreading is also reduced.

"Since we last met this Colony has decided to throw in its lot with the other Colonies. This decision has cleared the atmosphere, and already there are signs of returning prosperity—the tide is turning and the outlook is brighter. However much we have differed in the past on the question of Closer Union, we should all work together to make it a success. A favourable impression has been created in Great Britain, and purse strings will be loosened ,and investments made in South Africa. We hope that not only will money flow in, but that it will be brought by men who will make their homes here, for the cry of the country is a larger white population to develop and defend 'South Africa.'

"The thanks of the Association are due to Mr. Fly, the Hon. Secretary, and to Mr. Phipson, the Hon. Treasurer, for their valued assistance."

The following office-bearers for the ensuing year were elected:—Chairman: T. Fleming, J.P.; Vice-Chairman: T. W. Rudland; Hon. Secretary and Treasurer: W. J. Fly.

CAMPERDOWN.

The Camperdown Farmers' Association held their annual meeting on Friday, 6th August, in the Agricultural Hall, Camperdown. Mr. C. J. A. Scheepers presided; and there was a comparatively small attendance.

The following letter, addressed to the Secretary by Mr. H. A. Hime, Under Secretary for Agriculture, and dated 26th June, was read:—

"Sir,—With reference to your letter of the 8th ult., forwarding a resolution passed by your Association, asking that ten-ton trucks should be placed at the disposal of farmers for the conveyance of mealies intended for export, I have the honour to inform you that this matter has been fully considered, but that it is found that the rolling-stock at the disposal of the railway management makes it impossible to meet the suggestion to convey export maize in ten-ton loads."

The Secretary and Treasurer, Mr. J. Baker, presented a statement of the financial position of the Association, according to which there

was a credit balance of £6 0s. 9½d. for the year, as compared with £4 17s. 6d. for the previous year.

The President then addressed the meeting as follows:—

"At our last annual meeting Mr. H. Baker was elected President, but he resigned before the first quarter was out, and at the first quarterly meeting I was done the honour of being elected President, which office I have tried to fulfil with honour, knowing all the time my great shortcomings. I have been very glad to be so well supported by all. Mr. J. Moon and myself attended the Annual Conference in Maritzburg last April, of which Mr. Moon kindly gave a report at our May meeting. At our special meeting we considered tenders for fertilisers and grain bags, and we accepted tenders from T. Burman for the fertilisers, which have not been delivered yet. Of grain bags we also accepted tenders from T. Burman, but I am sorry to say the same have not given satisfaction all round. We had a public meeting the same day as the special, and the former was well attended. Mr. Hyslop, M.L.A., addressed the meeting on behalf of Closer Union, after whom Mr. H. Fell, M.L.A., also said a few words. I have been well pleased to note the good attendance at nearly all of our meetings, although I think we ought to be able to get a lot more new members, as our Association is small for such a place as Camperdown Division, with its large population. I now wish to express my hearty thanks to our Hon. Secretary, who has done his duty well, and has always been very obliging to everyone, and never thought it too much trouble to try and please all. I also thank all the members for all the support I had, and hope that you will all give my successor the same support with the same goodwill."

The meeting then terminated.

KLIP RIVER.

The Klip River Agricultural Society held their annual meeting at Ladysmith on the 14th August. The President of the Society (Mr. D. R. Bester) took the chair; and among those present were Messrs. G. Pinkney, W. Freer, H. Nicholson, J. G. Bester, Herman Illing, J. Farquhar, C.M.G., M.L.A., J. Newton, J. de Waal, H. C. Thornhill, R. Horsley, D. Sparks, T. Russell, E. Sparks, T. Russell (managing director of the Mooi River Creamery), and W. J. Teasdale (Secretary of the Society).

The President asked Mr. T. Russell to address the meeting.*

Mr. Russell said he had attended in response to a request from the Secretary. He understood that the request was in connection with the

* We are indebted to the *Times of Natal* for the following notes of Mr. Russell's speech and the remarks of the speakers following him.—ED.

establishment of a creamery in Ladysmith. The fact that the Mooi River Creamery was in existence might to some extent qualify his words. But he could assure all present that he would do his best to see a creamery started in Ladysmith. He would say that some two years ago he moved in the matter of adding to the Mooi River Creamery. That would mean an expenditure of £3,000, but in view of Tick Fever the scheme was abandoned. In view of East Coast Fever he would not advise the starting of a creamery in Ladysmith. At present the two creameries could handle all the milk they could obtain. They would understand that they would come into competition with Nel's Rust and Mooi River Creameries. It was the farmers that would have to put money into the creamery, if started. If a creamery were started it must be on co-operative principles. He was willing at any time to assist the Ladysmith farmers. With regard to the Mooi River Creamery they were able and willing to take all the cream that could be supplied. They were taking cream from the Transvaal. They paid railage at the station, and that practically made the Mooi River Creamery a Ladysmith creamery. In the summer they paid an average price of 1s., and in the winter an average of 1s. 3d. He was glad to say that the local creameries were gradually overtaking the imported article, and but for East Coast Fever they would have been exporting butter. But they could not export at 1s. per lb., for New Zealand butter was landed at 10½d. per lb., to which 2d. was added for duty. They gave a high price for butter, and if dairying was not a paying proposition, then they had not got the right stock. They had some really good cows, and what they should strive to do was to work up to the good average. That could only be done by testing the milk. There was money in dairying, and the creamery took the burden of work off the farmers' hands.

Details of Work.

Mr. Russell at this stage stated that under the process carried out at the Mooi River Creamery, and also the testing process, farmers could use both as a check against the factory, and a list of their cows. He laid great stress on the matter of cream cans. As far as they were concerned the factory returned cans daily. The N.G.R. carried milk, cream and cans at owners' risk. Though a co-operative concern they were not as strong as other concerns in the Colony, but they hoped to pay out for supplies on the 15th of each month. At present they paid out on the 21st of every month. They supplied separators at Pietermaritzburg prices, and allowed the cost to cover six months. They allowed each supplier to supply his own separator. He preferred the Alfa-Laval separator. It required more cleaning, but it took out more butter-fat than any other separator. The Globe was a good machine

also. But this was a matter of opinion, and, as with the plough, it was largely a question of the person at the back of the machine. He was glad to have the opportunity of addressing the meeting. He claimed that if farmers backed up co-operation and co-operative concerns, it was absolutely in the farmers' interests. They had people in the Colony who had put money into the concern for the good of the Colony. If they in Ladysmith could not get satisfaction from the existing creameries then they might start a creamery. They could get shares to-day in the creameries in Natal on favourable terms. They had asked the Government to assist them on co-operative lines, and that would have been for the benefit of the Colony. The Government did not help them. Competition in the way of starting new dairies meant a cut-throat policy. What was wanted was co-operation.

The President thanked Mr. Russell, and said that what was required in Klip River district was to get in cream from the outlying districts.

Mr. Farquhar said the idea was to find out if the Mooi River Creamery would not start a collecting station in Ladysmith. There would be railway works going on and a good demand. Until there was a collecting station locally, the small farmer would not trouble himself. He thanked Mr. Russell for what he had said.

Mr. J. G. Bester said that there were large farmers in the district who did not support the creamery. It would be to the advantage of the Mooi River Creamery to collect in the Klip River district.

Mr. Russell said the point was worthy of consideration. He had returned from a visit to Cundycleugh and Normandien, and had successful meetings. The creamery was running a cart from Newcastle to the Berg, and from Dannhauser to Cundycleugh. Farmers must help themselves. The Deity himself would not help those who would not help themselves. He suggested the formation of a local committee to consider the subject. A centre in Ladysmith would mean expense. The cream had better be sent direct to the Central Factory. It was only to-day the farmer was awakening to the benefit of creameries. He was prepared to assist the farmers in the running of cream-vans.

Mr. Farquhar suggested the advisability of calling another meeting, when Mr. Russell could again address the farmers. He proposed a resolution to that effect, and that the meeting be a public one on the first Saturday in September. Mr. H. Illing seconded.

Mr. J G. Bester said September was the lambing season. October was a better month. It was decided to call a meeting on the first Saturday in October.

On the motion of Mr. Farquhar, a hearty vote of thanks was accorded Mr. Russell for attending the meeting.

Tree-Planting Competition.

Mr. A. W. Smallie (Dundee), who was present, introduced the subject of tree-planting in connection with the Natal Agricultural Union. The speaker said that Mr. Maurice Evans, of Durban, introduced a tree-planting competition years ago, but it fell through. In connection with the present scheme he (the speaker) represented Dundee and district. Mr. Smallie referred to the utility of tree-planting in Natal, and to the fact that more forests in Natal would improve the Colony. The Government were not in a position to take up afforestation to any large extent, but in the Cape this had been done by the Government. The timber supply of the world was diminishing rapidly, and the only country in the world that had neglected the matter till lately was Great Britain herself. The idea of the Agricultural Union was to get farmers to compete for prizes, and afford object lessons in tree-planting to others. The Colony would be divided into three areas. The area for competition must not be less than five acres, but five varieties of trees could be planted. The judging of trees would take place in 1915. The trees must have commercial value. Hard-wood trees were required for railway sleepers, and Mr. T. R. Sims' book on tree-planting could be obtained as a guide. It was a book of educational value. Trees could be obtained from Cedara at one penny each (excellent trees), and the total cost of planting five acres would be £14 3s. 9d., plus railage. Seeds could also be obtained for planting. He hoped that farmers in every centre in Natal would take up the competition. It was a splendid investment for future generations.

The President thanked Mr. Smallie, and hoped that competitions would be entered into upon in the Klip River district.

On the motion of Mr. Illing, it was decided that the hon. secretary should endeavour to get subscriptions and entrants for the competition, the secretary expressing his willingness to do his level best.

A hearty vote of thanks was accorded Mr. Smallie for his address, on the motion of Mr. H. Illing.

PRESIDENT'S REPORT.

The Secretary having read the minutes of the last annual general meeting, the President presented the following report:—

Gentlemen,—I have again the honour to address you from the presidential chair.

It is not long since you had a report from me; therefore, I do not intend to give you a long one this time, as in my last I dealt fully on each agricultural subject.

CEREALS.

At the outset, I am inclined to deal with general conditions in respect to cereals, which, I am glad to say, have had a fair season, although not quite so successful as was expected, and this is due to the over-abundant rains we have had in this district during the year.

The price of mealies, at an average of about 8s. 6d. per bag, although not as high as we should wish, still is good enough to grow for, and now that we have the oversea markets, we cannot grow too extensively. Forage, too, was good, and there is an abundance even now.

STOCK.

Cattle have done fairly well, with the exception of the ravages of East Coast Fever, which disease, gentlemen, I am sorry to say, is still in our midst, and, although not spreading as fast as in some of the other centres of Natal, still is slowly making a headway, and keeping down prices of cattle.

Horsesickness has been of a serious nature, and there is still room for our Government experts to pronounce a cure for this disease, as well as for some of the other stock diseases.

Goats have done very badly, and have died in great numbers, the cause of which, I think, is wireworm, carried by the abundant rains.

Sheep also have not done well, but are recovering now that we have the new grass, and I hope to hear of a good lambing season.

DAIRY INDUSTRY.

Dairy work is, unfortunately, in a very undeveloped condition, but I presume that the presence of East Coast Fever has interfered with it to a great extent, and, gentlemen, I think there is plenty of room for improvement in the class of bull kept amongst our cattle. As an incentive, we have invited Mr. T. Russell, managing director of the Mooi River Creamery, to attend here to-day, and, I hope, with good results.

ATTENDANCE AT MEETINGS.

Now that we are about to enter into another new year of the Society, I would urge all members to be punctual at the meetings, and not keep your President and Secretary gathering you to attend a meeting, as hitherto. The same applies to paying your subscriptions. Our Secretary will enter into other details later regarding subscriptions.

In conclusion, I convey the Society's sincere thanks to the honorary officers and others who aided us by their advice, financial assistance, and influence during the year.

I have now to take my leave as President, thanking you for your patient attention and your assistance in my duties.

Finances.

The Secretary, in his report, showed that there was an overdraft at the Natal Bank of over £100, and several accounts to meet, including local rates.

Mr. Farquhar proposed that a committee of three be appointed to get in arrear subscriptions, to report in October.

Mr. D. Sparks said that the Society could only be kept alive by holding an annual show.

Messrs. J. Farquhar, H. Nicholson, and J. Bester were appointed as the committee.

Election of Officers.

The following officers were elected:—President, Mr. J. G. Bester; Vice-Presidents, Messrs. Dan Bester, D. Sparks, and H. Nicholson; Committee, the retiring committee was elected, with the addition of Messrs. W. W. Jones and D. E. Henry; Secretary and Treasurer, Mr. W. J. Teasdale; Auditor, Mr. J. T. Francis.

Messrs. J. G. Bester and J. De Waal were appointed as delegates to the Agricultural Union, with Messrs. D. R. Bester and D. Sparks as alternatives.

On the proposition of Mr. Farquhar, it was decided that the Society pay the expenses of the delegates.

The latest Imperial Institute Report on Fibres to hand (Colonial Reports—Miscellaneous—No. 58 [Cd. 4588]) contains an interesting note on a sample of *Furcroea gigantea* from Natal, which was received at the Imperial Institute for examination. The sample was labelled "Aloe fibre—Natal," and consisted of rather lustrous white fibre, which had been fairly well cleaned and prepared. It was of rather uneven strength. The length of staple was 4 feet. Chemical examination of the fibre gave the following results:—Moisture, 9·3 per cent.; ash, 0·9 per cent.; *a*-hydrolysis (loss), 12·7 per cent.; *b*-hydroylsis (loss), 14·7 per cent.; acid purification (loss), 1·7 per cent.; cellulose, 75·5 per cent. The sample was submitted for commercial valuation to experts, who described it as corresponding fairly well with "good fair quality" Mauritius hemp, and valued it at £26 10s. to £27 10s. per ton. At the time of this valuation Mauritius hemp was quoted in the London market at £25 to £30 per ton.

Correspondence.

POTATO SORTER.

TO THE EDITOR OF THE "AGRICULTURAL JOURNAL."

SIR,—It may interest you to know that we are agents for the potato sorter described on pages 11 and 12 July number *N.A. Journal*, and that we have a stock of these implements in Durban.

This sorter, which was exhibited by us at the last Durban Show, does good work, and can be seen and tested at work at our store, 235A, Pine Street, Durban, at any time.—Yours, etc.,

EDWARD E. DOWNING,
Manager, Rosetta Co-operative Association, Ltd.

Rosetta.

FIREBREAKS.

TO THE EDITOR OF THE "AGRICULTURAL JOURNAL."

SIR,—Can you inform me what would make the best fire belt? I mean, can one grow plants, shrubs or trees that will have a reliable effect in stopping a grass fire?

Of course, I am aware that a burnt strip is the best protection, but I would like to know if there is a natural living one available.—Yours, etc.,

Reitz, O.R.C. R. LEIGH.

[Wild sage, prickly pear, Mauritius thorn, wattle and beefwood are all satisfactorily employed for this purpose, though the usual method is, of course, to burn grass breaks around the area to be protected. Any tree or plant of non-inflammable character which by the nature of its growth kills out grass growing under trees will serve the purpose of a firebreak.]

WENSLEYDALE SHEEP.

TO THE EDITOR OF THE "AGRICULTURAL JOURNAL."

SIR,—Having taken an interest in the introduction of the better production of wool in Natal, and knowing the holder of the champion prizes for long-woolled sheep, he writes by this mail to inform me that, having taken an interest in the study of wool and exhibited fleeces at

the Royal Show for five years past, we hold two first prizes and three seconds from Wensleydale sheep.

The Wensleydale produces the finest quality of mutton of any long-woolled British breed, and their wool is the finest long staple lustre wool produced in the British Isles. It perhaps more approaches mohair than any other breed of sheep, and the wool from yearling hogs or yearling sheep is largely used for mixing with mohair for the production of bright dress fabrics, braids, etc. He is exporting rams for South America and feels sure they would, crossed with South African sheep, increase the weight of wool without deteriorating the quality. Those who have farmed in the north of Yorshire know that Wensleydale sheep are strong constitutioned and very active, and will serve more ewes than the sluggish Lincoln or Leicester. The weight of the washed fleece is 13 lbs., and of the whole flock 10 lbs., and finds a higher price than the other long-woolled sheep. If the breeders of this country can, by the introduction of long-woolled Wensleydale rams, add considerably to the weight of their fleeces and introduce by the crossing more hardiness in the flocks, such an introduction will benefit the Colony at large. The sample of wool I enclose is from a yearling ram and is one foot in length.—Yours, etc.,

ARTHUR DIXON, F.G.S., etc.

In founding a dairy herd, the cows should be selected with the greatest care and approximate as near a uniform type as possible. The successful breeder is one who understands the fundamental principles of animal improvement and who possesses the patience and ability to apply them in animal industry.

We have received from Messrs. Malcomess & Co., Ltd., the well-known machinery merchants of Durban and East London, a copy of a descriptive catalogue which they have prepared dealing with the most advanced machinery now on the market for the cultivation of the maize crop. The catalogue contains descriptions and prices of the most approved implements for use in connection with the maize crop, including ploughs, cultivators, shellers, etc., and will be found useful by farmers in selecting machinery for next season or to take the place of antiquated implements. Messrs. Malcomess & Co. will be pleased to send a copy to any farmer who wishes to obtain one.

THE FARMER BOYS' PAGES.

MONTHLY ARTICLES, NOTES AND PARAGRAPHS ON ELEMENTARY AGRICULTURAL SUBJECTS

FOR

BEGINNERS IN AGRICULTURE AND STUDENTS GENERALLY.

Conducted by "ARATOR."

*** *Correspondence, whether in the form of notes, comments, or inquiries, is invited from readers, and letters of general interest will be published and replied to in these pages. All communications should be addressed to* "ARATOR," C.o. Editor, "Natal Agricultural Journal," Maritzburg.

"Arator" to His Friends.

FROM this issue, henceforward, the FARMER BOYS' PAGES are to appear monthly in the *Agricultural Journal;* and in this, the first issue, I want to extend to all who are studying—whether practically, theoretically, or both ways combined—to become farmers, or to improve their knowledge of the science of farming, a cordial invitation to make free use of these PAGES for inquiries, interchange of ideas and experiences, comments, and so forth. If you have any trouble, if there is any particular point in the articles appearing in these PAGES about which you are not clear, or if you want anything explained, write to me, and if your inquiry is of sufficient general interest I will publish a reply in these PAGES, if not I will reply to you by letter.

* * *

These PAGES are not for school-boys only: they are for all, whether on the land or not, who are studying, who are observant, who want to know more about farming and what it means, who want to understand the *principles* of farming, or who want to pick up hints that will help them. Whether you are in town or in the country, you can learn a lot by reading, observation, and thinking; a tiny plot of ground will raise up for you a few mealies, or a bunch of barley or oats, or any other agricultural plants you like, and you can study them, watch them unfold, learn how the grain or other fruit forms, observe the result of a

handful or two of fertiliser on one lot as compared with another lot that has not been manured; you can watch for insects and learn their habits and (from the FARMER BOYS' PAGES later on) how to destroy them by means of sprays and washes; you can study the soil: in short, a little plot of ground in a back garden will enable you to learn a great deal if you read and are observant. A large plot will enable you to learn the importance of tillage, how to plant, and so on. A fruit tree or two and a grape-vine will give you an opportunity of learning something about fruit culture, such as, in particular, pruning, manuring, and treatment of insect pests. The keeping of a few fowls will give you further opportunities of combining theory with practice; whilst if you live on the farm, the farm animals will even be a source of interest to you.

* * *

Be satisfied with little beginnings; from them you can gradually add to your store of knowledge by reading and by continued observation; and I hope in these PAGES to give you plenty to read and think about as the months go by. All the articles will be written in a clear style, and will not be too technical. The young farmer wants to learn quickly; and consequently I am going to make the matter I publish as varied as possible. This month you have the first articles of three series: one on Soils, another on Agricultural Chemistry, and a third on Implements of the Farm; whilst you will find a variety of short notes, paragraphs, etc., of varied interest.

* * *

Remember to write to me whenever you want anything explained. Address your letters to "ARATOR," care of Editor, *Natal Agricultural Journal*, Maritzburg.

Implements of the Farm.

I.—THE PLOUGH.

THE plough is perhaps one of the oldest implements used in the tillage of the soil known to us. In various forms it dates far back into antiquity.

Whilst its purpose—to break up the soil—is still the same, it has undergone many modifications, until now we have, instead of an implement that merely *scratches* the surface soil, an instrument for actually turning the soil over, laying bare the under portions and burying the original surface. The modern plough, for so turning over the soil,

was invented in the Netherlands in the seventeenth century; it has, however, undergone much improvement since then.

There are many kinds of ploughs in use; among the chief may be mentioned wheel ploughs, swing ploughs, double-furrow ploughs, multiple furrow ploughs, gang ploughs, subsoil ploughs, one-way ploughs, ridging ploughs, paring ploughs, potato ploughs, steam ploughs, and draining ploughs.

Whatever the construction of a plough may be, it consists of some or all of the following principal parts, *viz.*: The cutting parts—the *share* and the *coulter*; the turning part—the *breast* or *mouldboard*; the *frame* or *skife*, to which the share and mouldboard are fixed, the whole forming the *body* of the plough; the *beam* and *handles*; the *bridle* or *head*; and the *wheel* or wheels, for regulating the width and depth of the ploughing. We will discuss each of these parts in turn.

The Share.—The share is the part of the plough which cuts the earth horizontally. It is fixed to a projecting portion of the lower part of the body of the plough, termed the *sole*. There are various forms of shares, adapted to different kinds of work, *e.g.*, square work, crested work, stony land, deep work, wide work, paring, setting out, ridging, subsoiling and so on. They are now invariably made of cast iron, chilled. These chilled shares have the advantage over the old wrought iron and other shares in that, whilst the upper part of the share is soft and tenacious, the under surface is as hard as steel. As a result, the upper part tends to wear away and the cutting edge always remains sharp; whereas the older shares had to be periodically relaid owing to their wearing blunt. Another point in their favour is that they require less draught.

The Coulter.—This is a large, strong knife, fixed at its upper end to the body of the plough, just over the share. It is designed to make a vertical cut through the soil as the plough moves forward. The coulter can be moved and so set to meet requirements. It is not usually set perpendicular, but at an angle, which varies with the nature of the land: the stiffer the land the greater the angle. A *skim coulter* is sometimes used in addition to the ordinary coulter. It is smaller, and is fixed to the beam immediately in front of the ordinary coulter. Its purpose is to pare off and turn into the furrow when ploughing lea and stubble, the herbage on the top of the furrow slice, in order that no vegetable matter may be left untouched but all completely buried.

The Mouldboard.—The cutting of the slice of earth, horizontally by the share and vertically by the coulter, is only the preliminary operation of the plough: the ploughing proper—that is, the turning over of the slice of earth so as to bury the surface and expose the under portion—is done by the mouldboard, the bright curved plate of cast iron immediately behind the coulter and over the share. This mouldboard

receives the earth as it is cut by the coulter and share and throws it over to the right, in a continuous strip. The important point about the mouldboard is, of course, its shape, for the angle at which it leaves the turned slice of earth depends upon the curve of the rear portion of the mouldboard, whilst if it is wished that the furrow-slice should lie unbroken the mouldboard must be of some length. Both long and short mouldboards may be seen in ploughs. Some farmers prefer a long mouldboard because it leaves the furrow-slice unbroken, whilst others prefer a short one because, by breaking up the furrow-slice, it helps to pulverise the ground. Under the old style of ploughing, the object was to get the furrow-slices to lie in even, definite lines, as unbroken as possible, and broken furrow-slices were taken as indications of bad ploughing. The modern idea, however, since the advent of the American chilled-steel "digging" breasts on ploughs, is to lessen the subsequent work of the harrow and cultivator by crushing the earth upon itself so as to break it up thoroughly. The better a plough breaks up the earth, nowadays, the better most farmers like it. A short mouldboard assists in this pulverising process, and for that reason it is, as a rule, preferable to a long one. In connection with the question of the length of the mouldboard, there are one or two points which should be borne in mind, *viz.*: A heavy clay soil is apt to clog a short mouldboard, on account of the greater hollow such a mouldboard contains as compared with a long one, and there will be more of a load for the animals to pull; on the other hand, a short mouldboard is preferable for sandy soils, because such soil will work freely off the mouldboard, leaving it brighter, and there will be less friction, and so less draught will be required. The more clay a soil contains, the longer the mouldboard should be, as a general rule.

The Frame of the plough is the central portion of the implement to which are fixed the mouldboard, beam, handles, etc.

The Beam is a strong iron bar or wooden beam, one end of which is fixed to the frame. The animals are yoked to the beam; and the coulter is fixed to it.

The Handles are fixed to the frame, and are held by the ploughman, who thereby keeps control over the implement, directing its course and keeping the depth of the furrow uniform.

The Bridle or Ploughead is a contrivance at the outer end of the beam to which the animals are yoked; and it is so constructed as to permit of the line of draught being readily adjusted. The draught shackle can be moved upwards or downwards or sideways to the right or left, as required.

Next month we will consider the working of the plough, the kinds of furrows it turns, subsoiling, etc.

Agricultural Chemistry for Beginners.

By ARCHIBALD PEARCE.

CHAPTER I.

To a layman chemistry is a bad as Greek; and yet, like most other things, its difficulties vanish when it is understood. It is no very serious task to grasp so much of the elements of the subject as will enable one to take an intelligent interest in such semi-technical writings as ordinarily appear in agricultural literature, and I propose to write a series of short articles on the subject of Agricultural Chemistry, with the hope of affording some assistance to those who regret the absence of a scientific education. It will, throughout, be my aim to write plainly and avoid technicalities as much as possible; to limit the articles chiefly to that branch of the subject which is concerned with fertilisers and soils; and to introduce only so much theory as is necessary for clear explanation. In two matters I must beg the reader's indulgence; first, that he should follow the series from the beginning, as the various chemical terms used will be explained as they occur, and not a second time; and, secondly, for my own deficiencies, of which I am only too well aware. There is so much to be said that a choice becomes difficult, and my choice may not always be the best; but I shall use my best discretion.

In treating a new subject of whatever kind it is usual to carefully define some of the new terms to be used. To commence with, chemistry is essentially the study of Elements and their Compounds.

ELEMENTS.

An element is a substance which no one has yet succeeded in breaking up into two or more simpler substances, or, in other words, which is composed of one kind of matter only. It is not impossible that some things now called elements may be eventually so divided, but until this happens they are considered to be indivisible substances. Elements are, so to speak, the bricks of which all other known substances are built up. There are between 70 and 80 known, some of them quite rare; those that will chiefly concern us are:—Oxygen, Hydrogen, Nitrogen, Chlorine, Carbon, Phosphorus, Sulphur, Silicon, Calcium, Iron, Aluminium, Potassium, Sodium and Magnesium. The last six are metals, the rest non-metals. All other substances are formed by the combination of various elements in various proportions, and substances of this kind are known as compounds.

COMPOUNDS.

It is essential to grasp the chemical meaning of this word; the elements which form a compound are so united together, and held in combination by a force called chemical attraction or affinity, that they cannot be separated by merely mechanical means. A simple experiment will make this clearer. If we take a little powdered sulphur, and grind it up with about twice its weight of iron filings, we shall see the particles of iron and sulphur lying side by side, and could wash away all the sulphur from the iron, or separate the iron by plunging a magnet into the mass, to which the filings will cling. Here we have a mere mixture, and no compound is formed. But if we now heat the mixture rather strongly a sort of glow will spread through the mass; a black substance will be formed in which no particles of either iron or sulphur will be visible, and upon which a magnet has no effect. Combination has taken place under the influence of heat; a compound of iron and sulphur, called iron sulphide, has been formed, entirely different in its properties from both iron and sulphur. Mixtures differ from compounds in another important particular: one can mix substances together in any proportion one pleases, but compounds always consist of the same elements united in the same proportions. For instance, in our experiment above, if we used exactly the proper proportions, *viz.*, 32 parts by weight of sulphur to 56 of iron, there would be no iron or sulphur left as such, but 88 parts of iron sulphide instead. If, however, we had taken, say, 60 parts of iron, there would still be only 88 parts of iron sulphide formed, the other 4 parts of iron remaining unaltered. It is this law of constant composition that enables the analyst to state definitely the quantities of various elements contained in their compounds.

NO DESTRUCTION.

Another important principle is that all matter is incapable of being destroyed. We can change its form, or make it disappear from view, but it still exists in some form or other, and by suitable means can be completely accounted for. When a candle burns, it disappears; it vanishes entirely, and in common language it has been destroyed. But this is not true in reality; the constituents of the candle have been undergoing combination with a part of the air, and the products formed are in the form of gases and invisible, which by proper means can be absorbed and weighed, and are found to actually weigh more than the original candle, the increase being due to that part of the air which has helped to form the new products.

(To be continued.)

A Chat about the Soil.

I.—HOW IT IS FORMED.

THE soil is by far the most important part of the farm: it is, in fact, the basis of all farming, for even stock farming could not be carried on without reference to the soil, since it is necessary for the provision of fodder and of grass for pasturing. It is to the soil, consequently, that we must devote our attention before we proceed to study agriculture proper (*i.e.*, "the cultivation of the soil") or farming generally (*i.e.*, "the using of the farm"—which means the production of crops, live stock, and live stock products, for which the soil is the prime necessity). Before we begin our study of the soil, however, it will be as well, since we have used the terms "agriculture" and "farming," to devote a few lines to explaining their real meanings, since many people confuse the two.

Agriculture has been described as "the art of cultivating the earth": the derivation of the word, in fact, supplies us with its real meaning—"*cultura agri*": the culture of the field, or land. Every process that has for its object the production of crops comes under the heading of "agriculture."

The word "farming" has a broader sense than "agriculture." Whilst farming in nearly all cases has agriculture as its base, it nevertheless goes beyond agriculture pure and simple, as it may include any of the various branches of stock raising (*e.g.*, dairying, meat production, wool production, ostrich rearing, and so on). Farming may, in fact, have no connection with agriculture pure and simple, and may, for example, consist of sheep farming only.

There are two main kinds of farming, then: agricultural farming and pastoral or stock farming; whilst from a combination of these two branches we get a third kind, known as "mixed farming."

Natal may be taken as an example of a country where these three kinds of farming are carried on together. Our Colony is divided into three geographical "belts" or "terraces," running fairly parallel with the coast-line, and known respectively as the Coast Belt, the Midland Belt, and the Upland Belt.* The class of farming mainly carried on varies, as a result, with each belt. On the coast belt agricultural farms preponderate; in the midlands the farms are as a general rule devoted

* The Magisterial Divisions that are included in each of these belts are as follows:—*Coast Belt:* Lower Umzimkulu, Alexandra, Umlazi, Inanda, Indwedwe, Lower Tugela, and Mapumulo. *Midland Belt:* Impendhle, Alfred, Ixopo, Richmond, Umgeni, Camperdown, New Hanover, Lion's River, Umvoti and Krantzkop. *Upland Belt:* Underberg, Polela, Bergville, Estcourt, Klip River, Umsinga, Dundee, Newcastle, Vryheid, Ngotshe, Utrecht, Paulpietersburg and Babanango.

to "mixed farming"—that is, partly agricultural and partly stock raising—although the tendency is towards stock farming; whilst in the upland belt stock farming preponderates. In this connection it is interesting to note that the farms in the coast belt carry not quite two per cent. of the total live stock of the Colony, while the midland farms between them carry 32 per cent., and the upland farms 66 per cent. On the other hand, on the coast 24 per cent. of the total farm area of that belt is cultivated, while the midland farms have 7·2 per cent. of their total area under crops, and the farms of the upland belt 1·8 per cent.

Imagine a time in our earth's history when the dry surface of the globe was nothing but rock—hard rocks of various kinds quite devoid of soil. Even now, the whole of the dry surface of the globe is not some parts of the world with no covering of soil, and examples of this on a small scale can be found in Natal.

It is from this rock that the soil has been formed, and consequently from this rock, too, the soil has derived its mineral characteristics. Rocks are composed of minerals, and, whilst there are several hundreds of kinds of minerals known, only about six or seven are of importance as the bases of soil material. These are: Felspar, Quartz, Mica, Calcite (Limestone), Hornblende, Augite, and Kaolinite (Clay).

When did the soil of our globe first begin to form? To this question no answer can be furnished, but throughout geological time there has been an innumerable succession of soils; fresh rocks have been formed, and these in turn have commenced to break up and form new soil; and so the process has been going on, and is going on, continuously.

So much for the origin of soils. Our next question is the formation of soils: granted that soils are formed from disintegrating rocks, *how* are they formed? What agency or agencies bring about this disintegration of the rock with its resulting "soil"?

Soils are formed chiefly as a result of the action of the weather, known as "weathering." This is a process which we must examine in some detail if we are to understand it properly.

The different agencies responsible are (1) Water; (2) Heat and Cold; and (3) Chemical Action. We will briefly discuss these three agencies in turn.

Water.—Water brings about disintegration of the rock directly (*a*) by soaking into the rock and dissolving out any soluble salts it meets with and thus helping to loosen the mineral particles, and (*b*) in cases of large areas of bare rock, by forming streams which gradually wear off particles from the rock and deposit them elsewhere.

Heat and Cold.—Water indirectly brings about disintegration by freezing in winter in the rock into which it has soaked. When water freezes it expands, and by this means it causes portions of the rock to break off in scales, lumps, or blocks. You may notice this process going

on on old brick walls and on the boulders in the veld. The heat of the sun in summer has also a considerable influence, and the alternating heat of the midday sun and cold of the night go far towards breaking up rocks by expansion and contraction.

Chemical Action.—Probably most people have noticed the "rusting" of rocks, resulting in pieces falling from the rock from time to time. This "rusting" is produced by the oxygen in the atmosphere, which causes the iron in the rock to "oxidise," as it is called, thus destroying its cementing power and causing the rock to fall to pieces.

So far, however, the "soil" we have obtained by these agencies is not the soil that farmers know and speak of; it is not soil that will produce crops, but merely debris containing mineral matter, which is insufficient for the proper growth of farm crops. The lower forms of vegetation, such as mosses and lichens, take possession of this "soil" first. They are, in fact, of so primitive a character as to be able to grow on the surface of the rock itself, utilising the raw mineral material of the rock and the air for their support and growth. These primitive plants decay and so furnish a certain amount of organic matter to the "soil," and it is from this point that we can, with any justice, speak of the rocky debris as "soil." The soil, such as it is, is now fitted to produce plants of a higher type, which, as they also decay, render the soil more and more capable of producing higher plants and more luxuriant growth.

When the decaying vegetable matter accumulates in excess we have what are called peaty soils, considerable areas of which are to be found in Great Britain and other portions of Northern Europe.

The decaying vegetable and animal matter in soils is called *humus*. Peat soils are thus all humus.

Another and very important agency by which the surface soil has been brought to a relatively productive state is, as Darwin has shown, the earthworm. These worms live on the vegetable matter of the soil; and to obtain this vegetable matter they take in large quantities of earth, which passes through their bodies and is thrown up on to the surface of the soil in the form of the little lumps familiar to everyone. This earth they bring up from the lower layers, so that their value is twofold: they bring up the lower soil to the surface, and they reduce it to a state of great fineness. Besides this, they are always dragging dead leaves, etc., into their burrows, thus adding to the organic matter in the soil; and their burrows themselves serve to admit air and moisture into the soil.

Mention must also be made of the part that microbes play in the soil. These microbes bring about the transformation of plant tissue

into humus. They also bring about the development of various acids—such as nitric, carbonic, humic, ulmic, and so on—and they are of importance in connection with the practice of manuring, as will be explained in other articles.

The Use of Lime in Cultivation.

THERE are very few soils that are not benefited by the use of lime dressings. Lime may be applied to land in one or other of three forms, either (1) by slaking with water and applying at once. This, in the language of the farm, is known as hot liming; (2) by putting it into heaps like dung, and covering the heaps with soil for a short time till the lime falls into a fine powder; and (3) by grinding the lime into a fine powder and then spreading it on the soil. This last-named form of applying lime is a recent practice, but is now looked upon with great favour by English agriculturists. Of course, land resting on limestone formations does not require the application of lime. The indications of land requiring lime on pastoral land can easily be determined by the character of the herbage. On some pastures it is found that the stock have no particular desire to keep the grass short. That is a sure indication of the want of lime. Lime is a constituent of bone, and necessary for the building up of the skeleton; and may be derived to some extent from the water they drink, but, in most cases, is derived largely from the food consumed. On that account, limestone soils are often preferred by horse-breeders. The rearing of young stock on a farm thus tends to exhaust the soil of lime.

It is common belief among farmers in the Old Land that lime opens up stiff, heavy soils, and binds together sandy soils. This, at first sight, appears paradoxical, but it is perfectly true. But the actions in each case are distinct. In the case of heavy clay soils, the lime causes the soil to lose its plastic state. The fine particles are granulated, or flocculated, thus admitting air and allowing water to pass more freely through the soil. For this purpose, the hot or caustic lime is most effective. On light sandy soils, which contain vegetable matter, its "binding" effect is due to the lime combining with the humus. This compound of lime and humus is a powerful cement, and binds the particles together. Hot lime has to be used with caution on such soils. It has been shown by Professor John Porter, B.Sc., that meadow hay, for instance, takes 32·1 lbs. of lime for every 1½ tons of hay taken from the land, and other crops in proportion; or taking an average of all ordinary farm crops, 30 to 40 lbs. of lime each year from

the soil. Some lime is also required for correcting the acids which accumulate in the soil. The great use of lime is to unlock or liberate the plant food in the soil, and render it available for crops; but it should be remembered that liming land poor in humus is of little use, unless it be to improve the mechanical condition of the soil. A farmer desirous of testing the value of lime on his land should get a few loads of it and try a load on each of several portions of his farm. The results of a simple experiment like that will show whether liming on a large scale is justifiable.—*Queensland Country Life.*

Muscles of the Horse.

ABOUT forty per cent. of the weight of an ordinary horse is muscle. All muscles concerned with locomotion are attached to bones, and when they contract they cause the bones to which they are fastened to move. The lower part of a horse's legs are nearly all bones, but the muscles in the body and upper part of the limbs are attached to various parts of the bony construction by tendons, and can thus produce a motion of the parts located some distance away.

The amount of motion produced by the action of, say, one of the horse's hind legs, will depend upon the length of the muscles and the relation of the bones to which they are attached. The commonest idea among students of this subject is expressed in these words: "Long muscles for speed, short muscles for power."

Newly-Hatched Chicks.

AVOID feeding the little chicks until forty-eight hours old.

Give fresh water and grit before food, and let the first meal be not more than they will pick up in five minutes, including the learning how to eat.

Five times a day for meals, and five minutes at a meal, should be the rule for the first two weeks. Then lessen to four and soon to three meals daily. Clean the feeding board after every meal, and if milk is given the dish must be cleaned and scalded daily.

Charcoal kept in the drinking water will help to ward of indigestion.

Sunshine is good medicine, but if it is excessively hot some shade should also be provided. The chicks will readily adjust themselves to the proper temperature if given a chance.

Good grass in pleasant weather is the best place for the chicks.

Sheep Notes.

IF you keep sheep at all, put good enough blood in them to get the very best returns from their products.

When early lambs are wanted, it is best to commence feeding the ewes grain two or three weeks before breeding them, or else give them fresh, flush pasture runs.

With all classes of stock, the value of good feed is wonderfully increased by close attention.

Whatever the breed is, profit requires that the greatest feasible amount of mutton be got out of it.

With sheep, as with all animals raised especially for meat, the greatest profit in feeding is gained while the animals are young.

There is no wool in the flock so important as the yearling fleeces, and the success of the wool crop depends almost entirely on the care of the lambs.

The fleece from a well-fed sheep of any breed is much heavier than from a poorly-fed sheep.

The character of wool varies much with climate, soil, etc., which necessitates many sub-divisions.

"Starters" and Their Use

A "STARTER" is merely a name given to milk specially soured for the purpose of hastening the ripening of sweet cream for butter-making, also in increasing the acidity of milk in cheese-making. Butter-milk, for example, may be used as a starter, or, in other words, as a means of starting or inducing lactic acid to form more quickly than it would do if unassisted. Ordinary sour milk, or butter-milk, are known as natural starters to distinguish them from a starter prepared in the laboratory from pure cultures of the lactic acid bacteria.

"Agrostis," writing in *Farm, Field and Fireside,* gives some useful points as to how to make an ordinary or natural starter. Place a quart of perfectly clean new milk, he says, drawn from a healthy cow, in equally clean surroundings and allow it to sour, the temperature being maintained at about 75 deg. Fahr., when it will become acid in from 15 to 24 hours; then skim off the top portion and throw away, afterwards mixing and stirring the remainder with several gallons of separ-

ated or skim milk which has been pasteurised by heating for twenty minutes to a temperature of 185 deg. Fahr.

The milk, which is now inoculated with the lactic acid bacteria, should be covered over with a clean muslin cloth and left to sour, meanwhile stirring at intervals, when, on the following day, the starter will be ready for use. To renew the starter, place one pint of it into two gallons of pasteurised milk and, when sour, add a little of it to the fresh cream when desired to promote starting.

ALCOHOL FROM SAWDUST.—The Paris correspondent of *The American Sugar Industry and Beet Sugar Gazette*, writing under date of May 27, 1909, says:—"There has been a great deal of talk lately about the manufacture of alcohol from sawdust and wood chips. Chemists have long known that this was feasible, but hitherto no attempt has been made to carry on the process on a large scale. A procedure, known as the Classen patent (French No. 365,595), which was recently granted, consists in heating the sawdust, along with sulphurous gas, in lead-lined digesters to a temperature of 250 deg. to 300 deg. F. for an hour. The acid and the oxygen of the air oxidize the cellulose matter, a portion of which is converted into glucose or 'grape sugar.' This, after being washed, is treated with an ordinary alcoholic ferment, and any excess of acidity is corrected by the addition of carbonate of lime. The company which is working this Classen process estimate they will be able to manufacture at once 250,000 gallons of wood spirit, but in the near future they anticipate they can more than triple this output, and later to bring it up to two million gallons, so that eventually they will be in a position to manufacture some five million gallons per year —or about one-eighth of the whole quantity consumed. Whether the said company will ever be able to manufacture from a ton of sawdust, costing $7.00, some 24½ gallons of alcohol, at a net profit of $10.50, is a matter of conjecture. It should be mentioned that in addition to the alcohol there would be some 6 gallons of acetic acid and about 1,700 pounds of 'cake,' which could be used for cattle feeding, if the Classen patent will do *commercially* all that is claimed for it. There is a great difference between a laboratory achievement and an industrial success. If it can accomplish these results the effect will be disastrous to the beetroot alcohol market, and more especially to those factories and refineries where both sugar and alcohol are manufactured. It would also lower the price of sugar most probably, for that large portion of the beet crop which is now used by the distilleries would have to be employed solely for the purpose of sugar-making."

Coal and Labour Return.

Return of Coal raised and Labour employed at the Natal Collieries for the month of July, 1909:—

COLLIERY.	Average Labour Employed.					Output.	
	Productive Work.			Unproductive Work.*	Total.		
	Above Ground.	Below Ground.	Total.			Tons.	Cwt.
Natal Navigation ..	382	619	1,001	18	1,019	27,118	0
Elandslaagte ..	308	650	958	15	973	18,177	4
Dundee Coal Co. ..	277	481	758	—	758	15,739	18
Durban Navigation ..	212	454	666	—	666	13,063	0
St. George's	222	465	687	—	687	13,033	0
Natal Cambrian ..	204	360	564	10	574	12,637	19
South African	126	286	412	53	465	12,184	2
Glencoe (Natal) ..	172	369	541	46	587	12 028	8
Talana..	130	385	515	17	532	9, 38	0
Newcastle	82	381	463	—	463	6,988	15
Hlobane	85	226	311	30	341	6,069	13
Natal Steam Coal Co. ..	90	195	285	—	285	5,538	12
Ramsay	87	151	238	7	245	3,880	0
Hatting Spruit ..	75	115	190	—	190	2,627	15
West Lennoxton ..	57	82	139	—	139	1,571	13
Ballengeich	59	86	145	28	173	1,320	0
Dundee Coal Co, B'rnside	17	56	73	134	207	95	0
Dewar's Anthracite ..	5	7	12	—	12	35	0
Vryheid ‡	10	6	16	—	16	26	0
Makatees Kop ..	4	—	4	—	4	12	0
Totals	2,604	5,374	7,978	358	8,336	161,183	19
Corresponding month, '08	2,024	5,185	7,209	703	7,912	139,495	1

	Productive Work.			Unproductive Work.	Total, July, 1909.	Total, July, 1908.
	Above Ground.	Below Ground.	Total.			
Europeans	199	170	369	52	421	370
Natives	892	3,394	4,286	192	4,478	4, 86
Indians	1,513	1,810	3,323	114	3,437	2,955

* Cost Charged to Capital Account. ‡ Includes June return, 16 tons.

CHAS. J. GRAY,
Commissioner of Mines.

Mines Department, Maritzburg, 9th August, 1909.

RETURN OF COAL BUNKERED AND EXPORTED.

Return of Coal bunkered and exported from the Port of Durban for the month of July, 1909:—

	Tons.	Cwt.
Bunker Coal	74,315	18
Coal Exported	40,948	13
Total ..	115,264	1

Customs House, Port Natal,
2nd August, 1909.

CHAS. WINSER,
pro. Collector of Customs.

Meteorological Returns.

Meteorological Observations taken at Govt. Stations for Month of July, 1909.

STATIONS.	TEMPERATURE (IN FAHR. DEGS.).				RAINFALL (IN INCHES).					
	Means for Month.		Maximum for Month.	Minimum for Month.	Total for Month.	No. of Days.	Heav'st rainfall in 1 day.		Total for Year from July 1st, 1909.	Total for same per'd from July 1st, 1908.
	Maximum	Minimum					Fall.	Day.		
Observatory ..	74·8	54·6	85·5	46·8	1·81	5	1·73	7th	1·81	·40
Stanger ..	75·3	54·1	86	47	1·31	4	1·11	6th	1·31	·34
Verulam ..	77·1	50·1	87	44	1·61	4	1·61	6th	1·61	·24
Greytown ..	68·9	37·7	80	28	·73	1	·73	6th	·73	Nil
Newcastle ..	72·7	29·8	78	21	·80	1	·80	7th	·80	Nil
Mid-Illovo ..	73·7	48·7	86	40	1·12	4	·94	7th	1·12	·14
Estcourt ..	70·2	31·9	77	24	·34	3	·34	7th	·34	Nil
Lidgetton ..	71·1	31·7	82	21	·54	2	·51	6th	·54	—
Umbogintwini ..	74·9	48·6	85	37	1·98	5	1·74	7th	1·98	—
Imbizana ..	78·2	52·0	92	43	1·17	3	·91	7th	1·17	·26
Port Shepstone ..	82·5	52·5	92	48	1·20	2	1·00	6th	1·20	·70
Umzinto ..	82·5	48·3	87	42	1·39	1	1·39	6th	1·39	·02
Richmond ..	71·2	43·1	83	35	·71	4	·67	6th	·71	·09
Maritzburg ..	73·9	40·3	83	32	·82	3	·68	6th	·82	·02
Howick ..	67·8	35·3	79	28	·62	2	·55	6th	·62	·05
Ladysmith ..	74·3	37·7	85	29	·56	2	·43	6th	·56	—
Dundee ..	67·5	43·4	75	38	1·04	2	·77	7th	1·04	Nil
Weenen ..	74·9	32·9	85	25	·36	3	·33	7th	·36	·02
Krantzkop ..	75·8	46·1	80	40	Nil	—	—	—	Nil	·11
New Hanover ..	73·7	39·2	80	32	·78	2	·68	6th	·78	Nil
Nqutu ..	63·5	40·6	74	34	·69	2	·49	6th	·69	—
Utrecht ..	74·6	25·3	81	23	·71	1	·71	7th	·71	—
Nongoma ..	71·3	45·6	84	39	·31	4	·20	8th	·31	—
Vryheid ..	68·8	43·0	75	37	·74	2	·50	8th	·74	·13
Mtunzini ..	76·2	55·9	80	50	4·96	5	3·70	7th	4·96	2·83
Hlabisa ..	77·9	56·2	87	50	·44	2	·30	7th	·44	·37
Ubombo ..	69·3	53·8	83	48	·05	1	·05	7th	·05	·16
Empangeni ..	76·5	48·7	86	41	3·26	2	2·90	7th	3·26	1·51
Point ..	—	—	—	—	2·62	4	2·30	6th	2·62	·47
Krantzkloof ..	75·2	60·9	88	44	1·07	1	1·07	7th	1·07	·01
Nottingham Rd.	64·8	25·6	78	14	·41	1	·41	7th	·41	—
Ngomi Forest ..	—	—	—	—	1·06	6	·53	7th	1·06	—
Mahlabatini ..	77·9	44·0	86	38	·37	1	·37	7th	·37	·04
Bulwer ..	—	—	—	—	·61	4	·47	6th	·61	Nil
Ixopo ..	—	—	—	—	·72	2	·64	6th	·72	Nil

Meteorological Observations taken at Private Stations for Month of July, 1909

STATIONS.	TEMPERATURE (IN FAHR. DEGS.)		RAINFALL (IN INCHES).					
	Maximum for Month.	Minimum for Month.	Total for Month.	No. of Days.	Heaviest rainfall in 1 day.		Total for Year from 1st July, 1909.	Total for same period from July 1st, 1908.
					Fall.	Day.		
Adamshurst	80	31	0·65	2	0·55	6th	0·65	Nil
Hilton	79	32	0·77	3	0·52	6th	0·77	0·08
P.M.B., Botanical Gardens ..	—	—	0·78	2	0·77	6th	0·78	0·04
Ottawa	—	—	1·62	3	1·36	7th	1·62	—
Umhlangeni	—	58	0·88	2	0·85	7th	0·88	0·42
Equeefa	93	47	0·93	1	0·93	7th	0·93	0·17
Umzinto, Beneva	—	—	1·01	2	0·98	6th	1·01	0·07
Reit Vlei	—	—	—	—	—	—	—	—
Branxholme	—	—	—	—	—	—	—	—
Cedara—Hill Station	81	39	0·63	2	0·60	7th	0·63	Nil
,, Vlei Station	77	23	0·64	2	0·59	6th	0·64	Nil
Winkel Spruit	85	41	1·77	2	1·65	6th	1·77	0·03
Weenen	84	27	0·27	2	0·25	6th	0·27	0·01
Giant's Castle	65·3	36·8	0·69	3	0·50	7th	0·69	0·04

Return of Farms at Present under Licence for Lungsickness and Scab.

STOCK INSPECTOR.	DISTRICT.	DISEASE.	OWNER.	FARM.
A. P. Craw ..	Ladysmith ..	Scab	E. Moreland ..	Reit Kuil
		,,	Mrs. M. J. v d Merwe	Coolfontein
		,,	Natives ..	Roosboom
		,,	Natives ..	Laurie's Kraal
		,,	H. Raath ..	Putteni Spruit
		,,	T. J. M. Buys ..	Reuit Kuil
		,,	A. W. Illing ..	Flagstaff Spruit
		,,	Natives ..	Goedgedacht
		,,	Mrs. pring ..	Reserve
		,,	A. G. Dannhauser	Riet Kuil
		,,	J. C Buys ..	,,
		,,	Natives ..	Roosboom
		,,	Natives ..	Blew Bank
		,,	Natives ..	Phoyflaai
		,,	J. Farquhar ..	Stewart Park
		,,	J. Hyde ..	Hydeswood
		,,	Natives ..	Kleinfontein
		,,	Natives ..	Roolpoort
		,,	Sparks Bros. ..	Brimley
		,,	Harvey ..	,,
A. B. Koe ..	Portion of Estcourt	,,	G. B. Jone ..	Bergveld
		,,	Schlanders Bros. ..	Kelvin
A. C. Williams ..	Utrecht ..	,,	Umlumbo ..	Twyfel ontein
		,,	Umtellen ..	Do.
		,,	Natives ..	Groot Vlei
		,,	Mrs. R. P. Spies ..	Goede Hoop
		,,	Natives ..	Onverwacht
		,,	Natives ..	Groot Vlei
		,,	Natives ..	Sandspruit
		,,	Tot Nel ..	Weihoek
		,,	J. van Schalkwijk ..	Weltevreden
		,,	M. L. Adendorff ..	Waterval
		,,	A. T. de Jager ..	Eenkanthango
		,,	J. F. Meyer ..	Roode Zand
		,,	T. Bezuidenhout ..	Vogelkrantz
		,,	Natives ..	Beschaauw
		,,	Natives ..	Goedgeloop
		,,	P. L. Uys ..	Town Lands
H. Van Rooyen ..	Babanango ..	,,	Sloekwana ..	Haitstogd
		,,	Natives ..	Hartstogd
		,,	C. van Rooyen and Natives ..	Vriendschap
		,,	Natives ..	Evergreen
		,,	Natives ..	Paardeplaat
		,,	Natives ..	Swartfontein
		,,	Natives ..	Welverdiend
		,,	Natives ..	Uitkyk
		,,	Natives ..	Verduveld
L. Trenor ..	Alfred ..	,,	Yalwayo ..	Location
		Lungsickness	J. T. Clothier ..	Whitecliff
		,,	C. Knox ..	Knoxwood
		,,	Sigumu ..	Lot F
		,,	Mqunansla ..	Omega
		,,	Spingaan ..	Hawarden
		,,	Jabula and Sonjela	Mount Pleasant
		Scab	Incati ..	Location
		,,	Makerlu ..	,,
		Lungsickness	G. Hogg ..	Lorna Doone
J. Ralfe ..	Lion's River ..	Scab	Smith & Braithwaite	Loskop
		,,	W. Holmes ..	Howick Commonage
C. T. Vaughan ..	Paulpietersburg ..	,,	P. Allen ..	Welverdiend
		,,	P. Marais ..	Makeleeskop
		,,	T. Uys ..	Morgenzon
		,,	C. J. Combrink ..	Kuilspruit
		,,	C. J. van Rooyen ..	Jachtpaan
		,,	A. Herbst ..	Schikhoek
		,,	A. Kusel ..	Jachtdrift
		,,	J. C. Boshoff ..	Dordrecht
		,,	P. van Rooyen ..	Leliefontein
		,,	D. Grezel ..	Spilhoek
		,,	E. Dodds ..	Jachtdrift
		,,	C. C mbrink ..	Pivaan
		,,	D. van Coller ..	Schurueberghoek
		,,	C. P. Botha ..	,,

RETURN OF FARMS UNDER LICENCE *(Continued)*.

STOCK INSPECTOR.	DISTRICT.	DISEASE.	OWNER.	FARM.
C. T. Vaughan ..	Paulpietersburg ..	Scab	Natives ..	Schurueberghoek
		,,	A. J. Kriel ..	Vaalkop
		,,	G. P. Slabbeit ..	Pardefontein
		,,	H. E. Ries ..	Welgegen
		,,	N. J. Bels ..	Viljoen's Rest
		,,	Natives ..	Town Lands
R. Wingfield Stratford	Newcastle ..	,,	Rapane ..	Walmesley
		,,	W. Moller ..	Mardenash
		,,	W. Steel ..	Botha's Pass
		,,	T. Ball ..	Ruston
		,,	A. P. de Jager ..	One Tree Hill
		,,	H. O. Eksteen ..	De Wetstroom
		,,	Natives ..	Stalkrantz
		,,	H. Hamilton ..	Glendale
		,,	S. W. Reynolds ..	Town Lands
		,,	F. R. Muller ..	Leyden
		,,	J. S. Watson ..	Bismarck
		,,	M. C. Adendorff ..	Sandford
		,,	Natives ..	Cheirs Lek
		,,	J. Dixon ..	Blauwbosch
		,,	Angus Wood ..	Harte Rivier
		,,	M. J. Oosthuizen ..	Enden Vlei
		,,	T. Lazenby ..	Springbok
C. E. Walker ..	Portion of Estcourt	,,	Oates, W. E. ..	Oatsdale
		,,	Mrs. J. H. Wallace	Cliffdale
		,,	A. Stuart ..	Glen Stuart
		,,	Natives ..	,,
		,,	J. McFie ..	Lowlands & Stocklds
		,,	H. T. K. Miller ..	Beacon Hill
		,,	A. Carter ..	Glendoone
		,,	F. H. Kerr ..	Rock Mount
G. Daniell ..	Vryheid ..	,,	Manqulu ..	Hardbetaa
		,,	Mkelegana ..	,,
		,,	Mzinzati ..	Groenkok
		,,	Kuyeze ..	Mooiplaat
		,,	Natives ..	Berlin
		,,	J. H. Gunter ..	Palmietfontein
		,,	Natives ..	Wagendrift
		,,	Natives ..	Prado
		,,	Natives ..	Bedrog
		,,	Natives ..	Vleiplaats
		,,	T. Curtis ..	Sandhurst
		,,	Natives ..	Dugeraad
		,,	Natives ..	Rustenburg
		,,	Mrs B. Webbe ..	,,
		,,	C. Beneke ..	Langkrans
		,,	M. v d Westhuizen	Vaalkopje
		,,	Natives ..	Cranstoot
		,,	Natives ..	Prado
		,,	Natives ..	Zaaifontein
		,,	Natives ..	Kandaspruit
		,,	Natives ..	Alpha
		,,	J. J. Odendaal ..	Uitkomst
		,,	J. C. Greoning ..	Hartebeestelaagte
		,,	H. D. F. Rabe ..	Langkrans
		,,	J. J. de Jager ..	Vrdehof
		,,	J. A. Viljoen ..	Stillwater
		,,	F. Combrink ..	Bankroset
		,,	P. J. Swarts ..	Aloeboom
		,,	J. M. Kockemoor ..	Scheeperslaagte
		,,	Natives ..	Schurlhoek
		,,	J. Birkensstock ..	Vergelegen
		,,	S. Labuschagne ..	Aloeboom
		,,	J. N. Swaart ..	,,
		,,	C. S. van Rooyen ..	Bloeurendal
		,,	D. Swarts ..	Aloeboom
		,,	Micah ..	Groenkop
		,,	C. van der Merwe ..	Nooitgedacht
		,,	C. van Rooyen ..	Bloeurendal
		,,	P. Tredoux ..	Weinansrest
		,,	J. H. Lombard ..	Diefsntein
		,,	H. A. Lombard ..	,,
		,,	A. W. Meyer ..	Kromellur' org
		,,	G. H. van Rooyen ..	Vresgewacht
		,,	W. F. van Rooyen	Bloemendal
		,,	A. Jansen ..	Frauimtzicht
J. R. Cooper ..	Nkandhla & Nqutu	,,	Ncede Biyela ..	Mpandhleni
		,,	Mgele Biyela ..	,,
		,,	Natives ..	Engazini

RETURN OF FARMS UNDER LICENCE *(Continued)*.

STOCK INSPECTOR.	DISTRICT.	DISEASE.	OWNER.	FARM.
J. R. Cooper ..	Nkandhla & Nqutu	Scab	Natives ..	Mkonjana
		,,	Natives ..	Macebo
		,,	Natives ..	Selutshana
		,,	Natives ..	Nqutu
		,,	Natives ..	Telezi
		,,	Natives ..	Tshutshosini
		,,	Natives ..	Hlazagazo
		,,	Natives ..	Masodgeni
		,,	Natives ..	Blood River
		,,	J. G. du Preez ..	Noudweni
		,,	Natives ..	Mbilane
		,,	Natives ..	Huladu
		,,	Natives ..	Emgezini
		,,	C. E Parr ..	Sandhlwana
		,,	H. Muller ..	Nqutu
		,,	Natives ..	Ncenceni
		,,	Natives ..	Mapaswaneni
		,,	Natives ..	Mkonjana
		,,	Natives ..	Vauts Drift
		,,	Natives ..	Nondweni
		,,	Natives ..	Mafethling
		,,	Natives ..	Mkonjana
E. Vart	Western Umvoti ..	,,	D. C. S. Nel ..	Highfield
		,,	H. Hansmeyer ..	Onres
J. F. van Rensburg	Ngotshe ..	,,	P. J. van Vuren ..	Driefontein
		,,	C. S. Fouche ..	Kondelage
		,,	Mjanja ..	,,
		,,	Natives ..	Langerwacht
		,,	F. M. Borthwick ..	Mooi Vlei
		,,	Natives ..	Mooiklip
		,,	C. J. Vermaak ..	Groenogden
		,,	J. A. Schultz ..	Onvewacht
		,,	J. C. Emmett ..	Goudhoek
		,,	A. M. Potgieter ..	Good Hope
		,,	B. C. Hatting ..	Avonduur
		,,	Natives ..	Tochygeisnde
		,,	J. D. Bester ..	Smaldeel
J Stewart ..	Bergville ..	Lungsickness	O. Zunckel ..	Rustenburg
		Scab	J. Caskel ..	Warhoop
		,,	J. H. de Jager ..	Tulinchesnall
E. W. Larkan ..	Umsinga ..	,,	Oyugnlangans ..	Umsinga
		,,	George ..	Gordon Memorial
		,,	Tshantulu ..	Umsinga
		,,	Susezulu ..	,,
		,,	Ngongola & Somseu	,,
		,,	Nthubusu ..	Gordon Memorial
		,,	Movenwa ..	Umsinga
		,,	Sandhlwana ..	,,
		,,	Nyamans ..	,,
		,,	Amos ..	,,
		,,	Foposa ..	,,
		,,	Natives ..	Location
		,,	Natives ..	Gordon Memorial
		,,	Natives ..	Vaalkop
		,,	T. H. Dedekind ..	Harding
		,,	A. Muller ..	Sutherland
		,,	W. W. Strydom ..	Oranje
		,,	Natives ..	Craignulla
		,,	Natives ..	Klippoort
R. Mayne ..	Eastern Umvoti & Krantzkop	,,	J. A. Nel ..	Welgegund
		,,	Natives ..	Burleigh
		,,	J. P. C. Nel ..	Spitzkop
		,,	W. Turpin ..	Olivefontein
		,,	J. C. Nel ..	Spitzkop
		,,	Natives ..	Ematimabolo
		,,	P. and H. Mare ..	Speculation
		,,	W. Havemann ..	Sophiadale
		,,	J. T. Martens ..	Groenkop
E, W. Bowles ..	Ixope ..	,,	Bogwan ..	Arundel
		,,	Nduba ..	Waverley
		,,	Makafana ..	,,
		,,	Njoyetala ..	Lot 29
		,,	Gungatshi ..	Location No. 3
		,,	G. H. Cooper ..	Avetary
		,,	D. E. Hardman ..	Ellington
		,,	Mandemba ..	Lot D.U.
		,,	Tebenga ..	,,
		,,	E. F. Garland ..	Springvale
		,,	E W. Veley ..	Aythorpe
		,,	Gangadene ..	Coolhill

RETURN OF FARMS UNDER LICENCE *(Continued)*.

STOCK INSPECTOR.	DISTRICT.	DISEASE.	OWNER.	FARM.
E. W. Bowles ..	Ixopo ..	Scab	Solabamba ..	Gorton
		,,	Godhloza ..	,,
		,,	J. Johnson ..	Vlei Cottage
		,,	Bobejana ..	Lot K of 5
		,,	Mangatshu ..	McKenzie
		,,	Boyeni ..	Smithfield
		,,	Koyesa ..	McKenzie
		,,	G. Smith ..	Smithfield
A. H. Ball ..	Weenen.. ..	,,	J. P. Lotter ..	Berg Vleit
		,,	P. H. Van Rooyen	Buffels Hoek
		,,	P. P. van Rooyen ..	Doornkloof
		,,	Naude & Lotter ..	Scottshoek
		,,	J. T. van Rooyen ..	Belle Vue
		,,	Natives ..	Oribefontein
		,,	Natives ..	Scottshoek
		,,	Natives ..	Scottspoort
		,,	Natives ..	Accilia
		,,	J. R. van Rensburg	Blinkwater
		,,	J. S. Els ..	Scottsburg
		,,	E. C. Robinson ..	Mona
		,,	S. C. van Rooyen	Middelburg
F. Kruger (acting) ..	City, Umgeni ..	,,	Umveli ..	Zwaartkop Location
		,,	Dria ..	,,
		,,	Samuel .	,,
		,,	Jantje ..	,,
		,,	Laduma ..	,,
		,,	L. Taylor ..	,,
		,,	Ramen ..	Ellis' Estate
		,,	J Henwood ..	Hilton Road
A. J. Marshall ..	Dundee ..	,,	A. C. Vermaak ..	Sigtuma
		,,	T. C. Vermaak ..	Harrisdale
		,,	J. W. de Bruyn ..	Rooifontein
		,,	B. J. Badenhorst ..	Kem enveldt
		,,	L Badenhorst ..	Kelvin
		,,	H. A. J. Davel ..	Kliprug
		,,	C. T. Vermaak ..	Kalderfontein
		,,	H. P. Handley ..	Giba
		,,	D. C. Uys	Parys
		,,	Honeywill & Taylor	Rietbokspruit
		,,	Harvey & Retallach	Slerkstroom
		,,	Natives ..	Conte ford
		,,	,, ..	Ruigtefontein
		,,	A. A. Turton ..	Dundee Town Lands
		,,	McKenzie & Kruger	Dabray
		,,	Natives ..	Klipport
		,,	G. Lidgett ..	Northfield
		,,	Natives ..	Waschbank
		,,	Geo. Kremer ..	Dalry
		,,	Natives ..	Biggersgat
		,,	R. J. Marshall ..	Cleveland
		,,	J. de Jager ..	Waschbank
		,,	Natives ..	Blinkwater
		,,	Natives ..	Hartebeestfontein
		,,	Natives ..	Doonside
		,,	J. Hatting ..	Limestone
		,,	G. R. van Rooyen..	Singletree
		,,	Natives ..	Goedekens
		,,	Natives ..	East Hesterton
		,,	C. M. Meyer, Sen...	Glad tone
		,,	R. J. Marshall ..	Woodlands
		,,	J. B. Wade ..	Stanton
		,,	C. J. P. Landman	Iro dale
B. Klusener ..	Lower Umzimkulu..	Lungsickness	Nyapu	Berbeck
E. J. B. Hosking ..	Upper Umkomanzi	Scab	A. Nicholson ..	Roselands
A. Brown ..	Polela & Underberg	,,	J. G. Mack —	Sepenore

MANGE IN HORSES EXISTS AS UNDER

Owner.	Farm.	District.
Pinda, Vete & Sobuon ..	Strathsoon	Impendhle
Natives ,, ...	Olivefontein	Umvoti
Natives	Tetworth	Lion's River

Pound Notices.

NOTIFICATION is contained in the *Government Gazette* of the sale, unless previously released, of the undermentioned live stock on the dates specified:

ON THE 15TH SEPTEMBER.

Ashley, Ixopo.—Bay gelding, blaze, off hind foot white, tail cut square, very mangy, aged.

Enqabeni, Alfred.—Cream gelding, aged, square cut tail, star, long coat, found straying on the 14th July, 1909.

Good Hope, Klip River.—Four Kafir goats, blue ram, black ewe, blue ewe and white ewe. Various ear marks.

Hope Farm, Newcastle.—Bay gelding two white hind feet, long mane and tail, no brands or ear marks; bay mare, black points, long mane and tail, no brands or ear marks.

Vryheid.—Three Merino ewes, branded N in both red and black, also ear marks. Impounded by Mr. H. Lombaard, Bloemhof.

Woodstock, Bergville.—Running on the farm "Zuur Laager," and reported by C. Halforty as being too wild to be driven to Pound: Black mare, branded V.S. on right flank; bay filly, branded what looks like S.M. on right flank; black filly, no brands.

ON THE 7TH OCTOBER.

Acton Homes, Bergville.—Bay mare, about 14 hands, aged, and blind in the right eye, no marks or brands visible.

Donnybrook, Polela.—Black ram goat; two black ewe goats; white ewe goat; white kid goat; black kid goat.

Greytown. Running on the farm "Highbury," and reported by Mr. J. T. Martens as being too wild to be driven to the Pound: Merino ewe and lamb, brand invisible, looks like]-E, square on front of left ear Probable value, 12s.

Klip Spruit, Normandien.—Five Merino ewes, in very poor condition, left ear square, cut out right ear, half moon.

Nqutu. Seven Merino sheep, two rams, five ewes, all with tip off left ears.

Richmond.—Black he goat! three black she goats; black kid; he goat, black and red; grey she goat.

Thornville Junction.—Brown or bay gelding, newly clipped, about 15 hands, branded L on off hip; brown or bay gelding, newly clipped, about 15 hands no visible brand; dark brown mule, long tail, shod on front feet, branded R over another brand, looks like /R on off rump.

Vryheid.—Two Merino ewes, with indistinct brand in red, like D, also ear marks, left ear three nicks the one half or top of right ear cut down middle. Impounded by A. McLeod, farmer, Vryheid District.

Woolstock, Bergville.—Five Black Kafir Sheep, two Black Kafir Sheep rams, slit in back of left ear in each ram.

Notice.

OWING to the increasing demands upon our space, we have arranged to publish *quarterly* instead of monthly as hitherto certain standing reference matter. This matter will consist of (1) Scale of Charges for Vaccines, etc., at the Government Laboratory; (2) List of East Coast Fever Advisory Committees; (3) List of Executives of Farmers' Associations; and (4) List of Publications issued by the Department of Agriculture. In future readers will find this matter in the January, April, July and October issues of the *Journal*.

Farm Apprentices' Bureau.

LIST OF APPLICANTS.

THE following is a list of the applicants which have so far been received by the Editor of the *Natal Agricultural Journal* from boys desirous of obtaining positions on farms. Farmers wishing to get into communication with any of these applicants should address their enquiries to the office of this journal.

The majority of the applicants have, of course, had no farm experience, but all appear to be strong, healthy and willing.

No.	2.	Age 15.	Has had 18 months' experience of farming. Understands more about forestry than general farming. Speaks Zulu, and understands Dutch.
,,	3.	Age 24.	Colonial born Has a knowledge of bookkeeping.
,,	4.	Age 18.	Natal born. Anxious to learn farming.
,,	5.	Age 24.	Speaks Zulu. Keenly interested in farming.
,,	6.	Age 17.	Still at school. Speaks French fluently, and has a fair knowledge of German and Dutch. Is very well educated. Particularly anxious to learn farming.
,,	11.	Age 18.	Has had two years' experience on a sheep farm in the O.R. Colony. Is particularly anxious to get back on a farm. Is very willing and obedient.
,,	13.	Age 20.	Is an orphan. Is anxious to learn farming.
,,	14.	Age 16.	Natal born.
,,	15.	Age 19.	Is desirous of learning farming.
,,	17.	Age 20.	Speaks Zulu. Is keenly interested in farming.
,,	25.	Age 23.	Bricklayer by trade. Is anxious to get on a farm.
,,	26.	Age 18.	Has a knowledge of Zulu. Was brought up in a farming district in Scotland.
,,	27.	Age 19.	Has had one year's experience on a farm in the Cape Colony.
,,	30.	Age 18.	Transvaal born Has had experience on a mixed farm. Speaks Dutch and Zulu.
,,	31.	Age 20.	Has a knowledge of engineering and carpentry. Is a Natalian. Anxious to learn.
,,	32.	Age 15.	Has lived on a farm for some years. Speaks Dutch and Zulu fluently. Is very intelligent.
,,	33.	Age 16.	Well educated. Speaks Dutch and Zulu.
,,	34.	Age 18.	Has a slight knowledge of Zulu. Understands carpentry.
,,	35.	Age 21.	Has had five years' experience on farms. Understands cattle and horses and Agriculture. Is anxious to get back on a farm.
,,	36.	Age 20.	Colonial born. Was brought up on a farm. Has a knowledge of bookkeeping. Speaks Zulu.

DRESSING FOR HARNESS.—The United States Government is responsible for the following recipe for a good harness dressing:—One gallon neatsfoot oil, two pounds of barberry tallow, two pounds beeswax, two pounds beef tallow. Put the above in a pan over a moderate fire. When thoroughly dissolved, add two quarts of castor oil; then while on the fire stir in one ounce of lampblack. Mix well and strain through a fine cloth to remove sediment; let cool, and you have as fine a dressing for harness or leather of any kind as can be had.

Employment Bureau.

THE Department of Agriculture has received applications from the undermentioned, who are prepared to become assistants or apprentices on farms. The Department will be glad to hear from farmers willing to take young men as assistants, and to place them in correspondence with the various applicants. Communications should be addressed to the office of this *Journal*.

No. 115.—Englishman, 26 years of age, steady and an abstainer, with a knowledge of cattle and horses, wishes employment on a farm in Natal (English preferred) as a handy man, with a view to furthering his knowledge of farming in this country. Is willing to accept food and clothing in a good home, for services, for a few months with the prospect of a small wage after the first three months.

No. 116.—Cape man, age 32 years; married, no children. Has been used to working with horses and mules all his life. Has good papers from his previous employers, and was in the employ of the Public Works Department for over five years. Is willing to do anything in his power, but cannot read nor write.

No. 117.—Englishman, 25, of good education, desires appointment as overseer on a plantation in Natal, and would pay a reasonable premium and give services free for a few months if necessary. Has had commercial, engineering, surveying and mining experience.

No. 118.—Pensioner from the Army desires to obtain post on a farm. Is particularly fond of gardening. Has excellent discharge papers and good testimonials.

No. 119.—Lady, experienced in dairy work, is desirous of taking charge of a dairy. Has gone through a course of butter and cheese-making, and holds good testimonials from Mr. J. Marshall Douglas, Chairman of the Royal Agricultural Society of England (1905).

No. 121.—Desires open air employment. Age 43. Life experience of agricultural pedigree and prize stock gained in Scotland. Has been six years in South Africa. First-class references and testimonials. Small salary required.

No. 122.—A young man, with life-long experience of cane-growing, desires employment as manager or overseer on a plantation. Experience has been in Queensland and Fiji. Is good at figures and capable of taking charge of books if necessary.

No. 123.—Married man, 35 years of age, with 5 years' experience on poultry and stock farm in California, wishes to get on to a farm in Natal. His wife is a good cook and handy in dairy. Would be willing to work for a very small wage or for their keep for a period of twelve months at least, after which they would expect some remuneration. Can produce first class personal references.

No. 124.—Single man, 35 years of age, with 8 years' experience in management of buildings, machinery and labour on a tea estate. Can undertake any sort of building or repairs, and has had a good experience of agricultural work. Will undertake any correspondence. First-class references and testimonials.

Farmers requiring good, steady farm hands would do well to communicate with Ensign Anderson, of the Salvation Army Shelter, Maritzburg, who constantly has good men at the Shelter who would be glad of employment at reasonable rates. Ensign Anderson pledges himself not to recommend for employment any but those he is satisfied will give satisfaction to their employers. He will be pleased to enter into correspondence with any farmer who may address him on the subject.

The more eggs a hen lays the smaller the size becomes.

Diamond Drilling.

SOME of the departmental diamond drilling plants are at present disengaged and available for hire for boring for either minerals or water. Particulars as to terms of hire may be obtained from the undersigned.

CHAS. J. GRAY,
Commissioner of Mines.

Land and Agricultural Loan Fund.

The Land and Agricultural Loan Fund has now been established, and the Board are prepared to receive applications for advances on security of first mortgage on fixed property. Appilcations must be made upon special printed forms, which can be obtained, together with full particulars as to the conditions under which advances are made, from the office of the Fund, Colonial Offices, Pietermaritzburg.

All Correspondence should be addressed to the Secretary, Land and Agricultural Loan Fund, P.O. Box 357, Pietermaritzburg.

Brands Allotted to Infected Magisterial Divisions.

The following is a list of the brands which have been allotted to the several infected Magisterial Divisions:—Durban County, D. 2; Alexandra County, A. 2; Lower Tugela, T. 2; Mapumulo, S. 2; Inanda, B. 2; Umsinga, U. 2; Dundee, X. 2; Vryheid, V. 2; Ngotshe, H. 2; Paulpietersburg, P. 2; Nongoma, G. 2; Mahlabatini, L. 2; Ndwedwe, N. 2; Weenen County, W. 2; Umvoti, F. 2; Hlabisa, K. 2; Eshowe, E. 2; Ladysmith, R. 2; Babanango, O. 2; Ladysmith, East of Line outside infected area, R. 3; Utrecht, Z. 2; Krantzkop, 2 K.; Umvoti Location, 2 F.; Ladysmith, West of main line of Railway, R. 3 on left neck; Pietermaritzburg City, 2 P.; Umlazi Location (Upper Umkomanzi portion), 2 U.; Umgeni Division, west of line, J. 2; Lion's River, east of line, 2 H.

Lice can destroy more young turkeys than any other disease, and the battle against this insect cannot be made too strong.

A young turkey needs sunshine. Some people make a practice of shutting their turkeys up in close, dark coops for the first week or two after they are hatched.

Government Cold Stores and Abattoirs.

PIETERMARITZBURG.

It is notified for the information of Farmers and others that Government is prepared to receive Cattle at the Government Abattoir, Pietermaritzburg, for Slaughter and Storage, if necessary, upon the following Scale of Rates and Charges, or such of them as may meet the requirements of Cattle owners. It must, however, be understood that owners will be required to make their own arrangements for the sale of the meat of cattle sent in for slaughter, the Government being unable to offer facilities or to accept responsibilities in this regard.

Cattle may also be received for slaughter at the Government Abattoir, Point, Durban, at the charges noted below. As the Government is unable to offer facilities for cold storage at Durban, or for the sale of the meat of cattle sent for slaughter, it must be understood that owners will be required to make their own arrangements in these respects, and the Government is unable to accept responsibility in either regard at Durban.

	Calves up to One Year old.	Cattle over One Year old.	For minimum number of 250 head per month.		For maximum number of 500 head per month.	
			Under 300 lbs. weight.	Over 300 lbs. weight.	Under 300lbs. weight.	Over 300lbs. weight.
	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.
1. Receiving ... ... per head	0 3	0 6	0 6	0 6	0 3	0 3
2. Killing and Cleaning ... ,,	2 3	3 6	2 9	3 3	2 6	3 0
3. Labour ... ... ,,	0 3	0 6	0 3	0 6	0 3	0 6
4. Disinfectants ... ... ,,	0 1	0 1	0 1	0 1	0 1	0 1
5. Bagging (4 Quarters) ... per body	1 9	3 0	2 6	2 9	2 3	2 6
6. Cleaning of Tripes ... ... each	0 6	0 6	0 6	0 6	0 6	0 6
7. Chilling of Beef, up to 72 hours or portion thereof ... ... per body	1 0	2 9	2 0	2 6	1 9	2 6
8. Chilling of Offal, up to 72 hours or portion thereof ... ... per set	1 0	1 0	1 0	1 0	1 0	1 0
Chilling and Freezing Beef—						
9. 1st week or portion thereof per body	2 0	4 6	3 9	4 0	3 6	3 9
10. 2nd ,, ,, ,, ,,	1 0	4 0	3 3	3 6	3 3	3 3
11. 3rd and remaining weeks or portions thereof ... ,,	0 8	3 0	3 0	3 0	3 0	3 0
Chilling and Freezing Offal—						
12. 1st week or portion thereof per set	1 4	1 6	1 4	1 4	1 4	1 4
13. 2nd ,, ,, ,, ,,	1 0	1 3	1 0	1 0	1 0	1 0
14. 3rd and remaining weeks or portions thereof ... ,,	0 9	1 0	0 9	0 9	0 9	0 9

A charge of 1s. per head is made in respect of any Sale of Cattle on leg at the Government Abattoir and a similar charge is made in respect of Bodies of Beef or portions thereof.

For further particulars apply to the Manager, Government Cold Stores.

Department of Agriculture, Maritzburg,
21st December, 1908.

Division of Agriculture and Forestry Notices.

FEES FOR AGRICULTURAL ANALYSIS.

It is hereby notified that Farmers and others can secure analytical determinations from the Government Laboratory, Central Experimental Farm, Cedara, in accordance with the following scale of fees, which is subject to revision :—

	Scale I. £ s. d.	Scale II. £ s. d.
FERTILISERS AND FEEDING STUFFS :		
Determination of 1 constituent	0 7 6	0 5 0
Determination of 2 or 3 constituents	0 15 0	0 10 0
Complete analysis	1 1 0	0 15 0
SOILS : Partial analysis of a soil in relation to its fertility	1 1 0	0 10 6
Complete analysis of a soil	2 2 0	1 1 0
WATER : Irrigation and drainage	1 10 0	0 10 6
VEGETABLE PRODUCE : Fodder, Ensilage, Grain, &c.	1 10 0	0 15 0
MILK, CREAM, BUTTER : Fat only	0 5 0	0 2 6
,, ,, : Complete	0 15 0	0 7 6
WATTLE BARK AND TEA : Tannin	0 5 0	0 2 6
CATTLE DIPS : Quantitative analysis of 1 to 3 principle constituents	0 10 0	0 5 0
INSECTICIDES :		
Qualitative analysis each constituent	0 5 0	0 2 6
Quantitative ,, ,, ,, ...	0 10 3	0 5 0

Scale No. 1 is applicable to samples handed in by merchants and Dealers, and where trade interests are involved.

Scale No. 2 is applicable to samples forwarded by *bona fide* Farmers and Gardeners.

Samples will be accepted at the discretion of the Director, and must be properly selected and labelled.

The Department reserves the right to publish the results of any analysis performed by it ; and, where such is deemed of sufficient public interest, it will remain at the discretion of the Director to remit any charges hereunder.

TREES FOR SALE.

To encourage tree-planting, transplants and seeds of forest trees are supplied by Government, so far as in stock, at the undermentioned rates, exclusive of carriage, from the Government Nursery, Central Experimental Farm, Cedara.

Transplants of Eucalyptus, Pines, Acacias, Casaurinas, Cupressus, etc., about 25 trees in each tin, at 8s. 4d. per 100 trees. Trees in separate tins at 1s. each.

Transplants of scarce kinds, larger trees, or surplus stock, when available, will be charged at special rates, which will be furnished on application.

Tree seeds, in variety, at 6d. per packet. Price per pound, which fluctuates, will be furnished on application.

Package and postage of seed, when required, charged 1s. per lb. extra.

PURCHASE OF TREE SEEDS.

With a view to the encouragement of seed production in the Colony, offers are invited from persons having locally-grown seed of exotic trees for Sale. Not less than one pound will be purchased ; and a specimen bearing seed vessels or flowers should be sent for identification purposes.

SILVER POPLAR.

Root suckers of the Silver Poplar (*Populus alba*) can be supplied in any quantity, at 8s. 4d. per hundred, on application.

MAIZE SEED.

Growers who may have for sale selected seed of the following types of maize are invited to communicate as early as possible with the Director, Cedara :—Horse Tooth, Hickory King, Boone County, Golden King and Yellow Dent.

POULTRY.

Orders will be received for selected cockerels of the following breeds for immediate delivery :—Buff Orpingtons, White Minorcas, Silver Wyandottes and Plymouth Rocks,

PERSIAN SHEEP.

An imported Woollen Persian Ram may be hired for the season at a fee of £5, at hirer's risk. Particulars on application. Orders for Haired Persian Rams will be booked for future delivery.

DEVON BULLS.

Offers are invited for three young South Down bulls, by imported bull, "Star of the West." Inspection can be arranged to suit intending purchasers.

CORRESPONDENCE.

Communications relating to the following subjects should be addressed in the first place to the officers responsible :—

Admittance of Students to the School of Agriculture.—House Master, Cedara.
Analyses of Soils, Fertilisers, etc.—Analyst, Cedara.
Felling Licenses, Purchase of Timber Sections and Squatters' Holding in Crown Forests.—Chief Forest Officer, Ixopo.
Afforestation, Timber Trees and Seeds.—Chief Afforestation Officer, Cedara.
Agricultural Seeds, Livestock, etc.—Farm Manager, C.X.F., Cedara.
Tropical Plants, Seeds, etc.—Manager, Government Farm, Winkle Spruit.
Agricultural Seeds, etc., for Irrigation Farming.—Curator, Government Station, Weenen.
Fruit.—Orchardist, Cedara.
Accounting Business.—Accounting Clerk, Cedara.

E. R. SAWER,
Director, Division Agriculture and Forestry,
Cedara.

A Test for Milk.—A simple and effective test to determine whether water is present in milk may be made with an ordinary knitting-needle, if the needle is bright and well polished. Dip the needle into the milk and quickly withdraw it in an upright position. If the milk contains only a small quantity of water this will prevent even a drop of milk adhering to the needle.

NATAL GOVERNMENT RAILWAYS.

REVISION OF GOODS RATES FOR LOCAL TRAFFIC BETWEEN N.G.R. STATIONS.

WITH effect from 1st September, 1909, alterations will be made in the rates for goods carried under the Normal, Intermediate, Intermediate "B," Rough and Imported Produce Classes, in Local Traffic between N.G.R. Stations.

The classification of Agricultural and Dairy Machinery and Implements will on and from the same date be altered from the Intermediate to the Rough Class, and the rates for Fencing Material will be reduced.

Full particulars of the above revised tariffs, together with other general alterations, will be published later.

EDWARD R. ROSS,
General Manager.

Railway Offices, Maritzburg,
5th August, 1909.

SOUTH AFRICAN STUD BOOK.

A record of all classes of Stock; the object being to encourage the breeding of thoroughbred stock and to maintain the purity of breeds, thus enhancing their value to the individual owner, and to the country generally.

Application for Membership and Entries of Stock should be addressed:—

For CAPE COLONY .. .. A. A. PERSSE, P.O. Box 703, Cape Town.
„ TRANSVAAL .. .. F. T. NICHOLSON, P.O. Box 134, Pretoria.
„ ORANGE RIVER COLONY .. E. J. MACMILLAN, Government Buildings, Bloemfontein.

THE SOUTH AFRICAN STUD BOOK

IS OBTAINABLE OF:—

T. MASKEW MILLER,
ADDERLEY STREET, CAPETOWN.

PRICE 10s. 6d.

A. A. PERSSE,
SECRETARY, SOUTH AFRICAN STUD BOOK ASSOCIATION.

HOLMES'
Special Cattle Dip

As one who five years ago first introduced a Cattle Dip in a concentrated form in the Colony, I have now brought out a New Dip, mixing 1 Lb. Dip to 16 Gallons Water. Price 6d. Per Lb.

HOLMES'

Messrs. Parker Wood & Co., Ltd., and Randles Bro. & Hudson, Durban and Maritzburg, hold the exclusive sale of this special Cattle Dip. . . . . .

This Dip has been thoroughly tested by farmers in the Colony upon tick infested cattle with remarkable results.

NOTE!—1 Lb. DIP to 16 GALLONS WATER, and only costing 6d. per lb.

For further particulars apply to :—

CHAS. W. HOLMES,

BOX 256, DURBAN,

Or to Local Representative :—

A. Saville, 297, Church Street, Maritzburg.

Farmers' Notice!

LIVE STOCK.

FARMERS desirous of Buying or Selling Live Stock will do well to communicate with us. We have always on hand, or to arrive, First-class Breeding Heifers, also Bastard or Merino Ewes. We are also prepared to supply Brood Mares, Stud-Stallions, Donkeys, Trek Oxen, Mules, Horses, etc.

PRODUCE.

Produce of every description sold on commission to best possible advantage.

TERMS PROMPT CASH. STORAGE PROVIDED.

Cash advanced on goods stored with us for sale.

Weekly Price Lists free on application.

Correspondence invited and promptly replied to.

REFERENCE:

African Banking Corp., Ltd., Johannesburg.

Hubert Morisse & Co.,

(ESTABLISHED 1901),

Live Stock, Market & Commission Agents.

MAIN STORES:

Loveday and Frederick Streets, Johannesburg.

P.O. Box 63. **Branch Store: Ophirton.** Tel. Address: "Naval."

LIVE STOCK . .
. . INSURANCE.

THE . . .

YORKSHIRE INSURANCE Co., Ltd.

RESERVE FUNDS EXCEED TWO MILLIONS.

The Undersigned are prepared to issue policies on HORSES and other EQUINE STOCK against mortality from disease or accident.

Full particulars and proposal forms on application.

SHOW RISKS.

Transit by rail, etc., including time on show and return, covered at reasonable rates.

Insurance of all kinds effected, Fire, Marine, Accident, Life, etc.

CHAMPION & CO.,

General Insurance Brokers,

FIELD STREET, DURBAN.

Box 117. Tel. Add. : "Championed, Durban."

Insurance of Mealies and other produce from place of origin to England or Continent or any part of the world, including risk of fire whilst awaiting shipment, at very low rates.

Important . . .

To Farmers.

Messrs. Lennon, Limited, beg to notify to the Farming community that they are now holding large stocks of all CHEMICALS for FARM use.

Sulphur. Ram's Head Brand.

Sulphate of Iron (Copperas). Ram's Head Brand.

Sulphate of Copper (Bluestone). Ram's Head Brand.

Arsenic.
Caustic Soda.
Washing Soda.
Bisulphide of Carbon.
Cattle Salts.
Epsom Salts.

Depôt for Bentley & Vanderpump's CONDITION POWDERS for Horses. It keeps them in good condition and prevents Horse Sickness.

Medicines for Cattle, Horses, Dogs, Poultry, etc., made up to Farmers' own recipes.

Disinfectants for Farm Use.

Write to us for quotations:—

LENNON, LIMITED,

Wholesale Chemists, **DURBAN.**

The Three Best Soaps in the Market.

Anderson's Pearl Soap.

Anderson's Three Crowns Soap.

Anderson's A 1 Blue Mottled Soap.

Why they are the Best.

Because they contain NO injurious chemicals, and therefore do NOT spoil the clothes.

Why you should use them.

1st. Because they are best value for your money.

2nd. Because they are made in the Country, and by supporting the country you live in you are supporting yourself.

MANUFACTURERS:

The Natal Soap Works, Ltd.,

P.O. BOX 44, **. . Durban.**

PICKSTONE'S

FRUIT TREES

ARE STILL IN FIRST-CLASS DORMANT CONDITION

Deciduous Trees from 1s. upwards.

Citrus Trees from 2s. upwards.

(Dependent upon Quantity ordered).

TRADE  MARK

Delivered, carriage paid, to your nearest Railway Station, if 50 Trees and upwards are ordered.

For Catalogue and Price List, in English or Dutch, apply to

H. E. V. Pickstone & Bro.,

P.O. Groot Drakenstein, C.C.

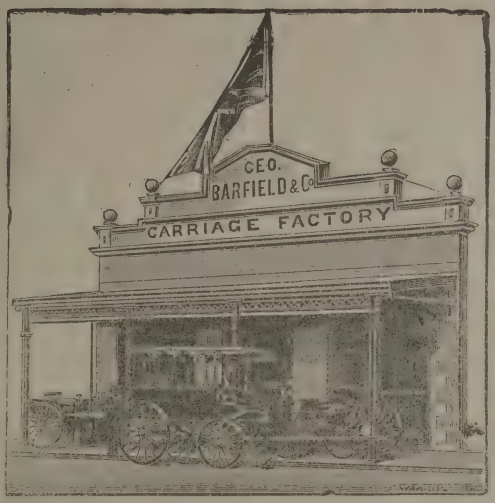
We hold Clean Bill for Trees for all South Africa.

P.O. Box 21 **GEORGE BARFIELD & CO.,** Telephone 391

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Builders of High-Class Vehicles. Both for Town and Country Use.

New and Second-hand Vehicles al-always on Hand.



Estimates given for all kinds o Carriage Work.

Direct Importers.

The Trade supplied at most reasonable Prices.

The Wattle Extract Co.

16 & 17, ANGLO-AFRICAN HOUSE,

SMITH STREET, DURBAN.

—Buyers of—

WATTLE BARK

In Any Quantity. Prompt Settlements on Receipt of Goods.

Highest Prices Given. No Commission Charged.

- - CORRESPONDENCE INVITED - -

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A . . .

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BY

CLAUDE FULLER.

PREPARED FOR THE USE OF FRUIT GROWERS, WITH NUMEROUS SELECTED ILLUSTRATIONS.

Price 7s. 6d., including Postage.

THE TIMES PRINTING & PUBLISHING CO., LTD.,

P.O. BOX 204.

The Times Printing & Publishing Co., Ltd.,
P.O. Box 204, *Pietermaritzburg.*

Please send me.....cop.....of the book entitled "A Fruit Grower's Handbook," by Mr. Claude Fuller, for which I enclose £ s. d.

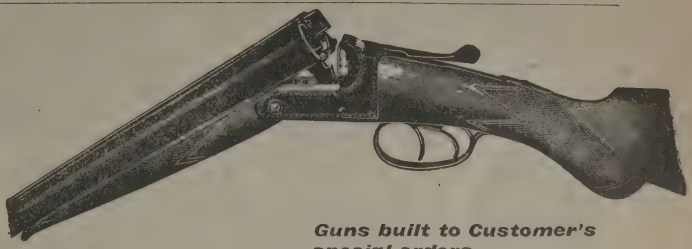
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We guarantee that the same noted Guns and Rifles sold by us during the past years are still being stocked and made in the same factory in Birmingham.



Guns built to Customer's special orders.

The Popular Gunmakers,

SOUTH AFRICAN GUN WORKS,

(Late) Hillsdon & Hillsdon,

——MANUFACTURERS OF THE——

WORLD-RENOWNED FAR-KILLING GUNS AND RIFLES.

BIRMINGHAM AND CAPE TOWN.

South African Depot:—**S.A. GUN WORKS,**

The Armouries, 16, BURG STREET, CAPETOWN.

Illustrated Catalogue sent POST FREE on application.

All New Guns and Rifles sent Carriage and Duty Paid.

HAYNE & CO.,

GENERAL BUYERS OF NATAL PRODUCE.

Mealies, Kafir Corn, Wattle Bark,

ETC., ETC., ETC

— ADDRESS —

72 & 74, COMMERCIAL ROAD, DURBAN.

— ALSO AT —

8, HARRISON STREET, JOHANNESBURG.

South Devon Cattle.

Celebrated for the Dairy and the Butcher—are hardy and stand a sea voyage well. At the Bath and West Show at Newport in 1907 they beat all others in the Butter test classes; they are the heaviest cattle in the World, and produce beef of the highest quality. Pedigree Auction Sales at Totnes first weeks of October and April each year. All particulars of—

ALFRED MICHELMORE, *Secretary Herd Book Society,*

Gate House, Totnes, ENGLAND.

England is the Home of Good Tailoring—
London the Fashion Centre of the World.

AN IMPORTANT SAVING
Can be effected if you order your clothes from London.

JOHN J. M. BULT,

Cash Tailor,
140, Fenchurch St., London, Eng.,
has a Special Department in his business for attending to the requirements of those abroad, where the same personal attention is given which has built up his reputation at home. He guarantees the best quality cloth the best styles also.

PRICES are as follows:

Frock Coat and Vest	from	63/-
Dress Suit (Silk-lined)	,,	84/-
Lounge Suit	,,	55/-
Norfolk and Knickers	,,	63/-

A choice of Tweeds, Flannels, Cheviots and Serges may be had. Kindly state which required—and the colour—when writing for patterns. Self-measurement forms on application. As a register is kept of all Customers' measures, an accurate fit is guaranteed.

RIDING BREECHES
cut on the most approved lines from 35/-

Address for Patterns and Self-measurement forms:—

J. J. M. BULT, P.O. Box 830, CAPE TOWN.

Mealies, Oats, Wattle Bark, Wool,

Mohair, Hides,

Skins, Horns, Bones, Hoofs, etc.

— THE —

Natal Export Co., Ltd.,

DURBAN,

Are buyers of the above Products in any quantity.

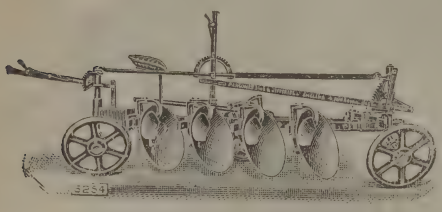
Terms: Prompt Cash on Delivery.

They will also undertake to consign Produce of any kind to the London Markets on behalf of Farmers and others on a commission of 2½ per cent., plus actual costs, and will advance 80 per cent. of the spot value on receipt of the goods.

LATEST CABLED INFORMATION AS REGARDS THE ENGLISH AND CONTINENTAL MARKETS IS ALWAYS AT THE DISPOSAL OF THEIR CLIENTS.

Office and Store:
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P.O. Box 198, Durban.



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DISC PLOWS

Will break up the hardest VIRGIN VELDT.

They do Magnificent Work.

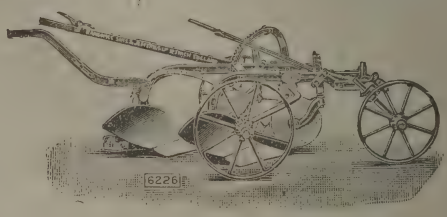
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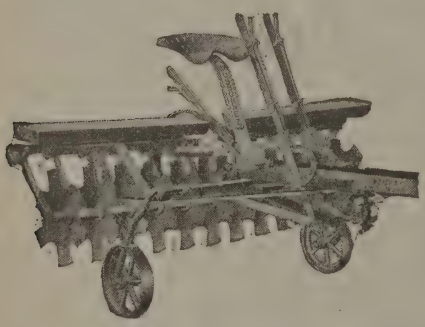
Invincible Plows

are made of Best Materials.



Are Strong and LIGHT OF DRAUGHT, and have good clearance under the beams for weeds. The wheels are dust proof.

BE SURE AND GET ONE THIS SEASON.



Osborne's

Cut-a-Way Disc Harrows

Are the Best ever imported into South Africa.

FITTED WITH WEIGHT CARRIERS AND TRANSPORT ATTACHMENT.

WRITE FOR PARTICULARS.

IF YOU ARE IN WANT OF

ANY Agricultural Implement

Write for Catalogue or call and Inspect our Stock.

Steel Murray & Co., MARITZBURG.

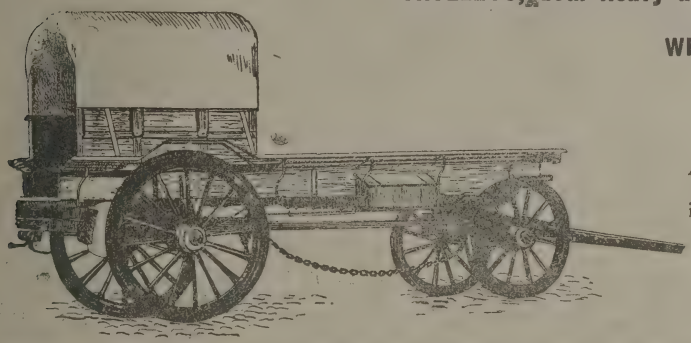
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Wagonmakers, Blacksmiths, &c.,

Supply Wagons of every description on Shortest Notice and at Low Prices; Workmanship and Material Guaranteed. Tip Carts, Light Delivery Carts; also Light Spring Carts suitable for Farmers and Dairymen.

TROLLEYS, both Heavy and Light.

WHEELBARROWS.



All Sizes of Wheels in Stock or Made to Order.

Sneezewood, Stinkwood, Stinkwood Shafts Sawn or Bent to Shape, Forgings, either for Ploughs Wagons, or Mowing Machines.

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Saddlers and Harness Makers,

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WE ARE SPECIALISTS FOR

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We stock the following and many other varieties:—

Kale	***Serradella***	***Fescue***
Lucerne	***Cocksfoot***	***Paspalum***

C. Starke & Co., Ltd., Mowbray, C.C.

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CATTLE PASTE DIP.

The popularity of this famous Dip is still maintained. Its reputation for keeping Cattle and Horses in a healthy condition is known to almost every farmer.

SHEEP FLUID DIP (Non-Poisonous).

The most efficient emulsifying Dip on the market, without exception. Thousands of gallons sold in the Colony annually.

SHEEP POWDER DIP (Poisonous).

In cases containing 48 packets. Mixes readily, cures the SCAB, kills the parasites as they hatch from the egg; improves the wool.

DISINFECTANTS.

KEROL.

Awarded the Gold Medal for Disinfectants at the Franco-British Exhibition, London, 1908.

INFALLIBLE FLUID.

A powerful but cheaper Disinfectant.

KEROL SANITARY POWDER.

Guaranteed to be four times more powerful than a 15 per cent. Carbolic Powder.

Please order your Dips and Disinfectants through your Merchant.

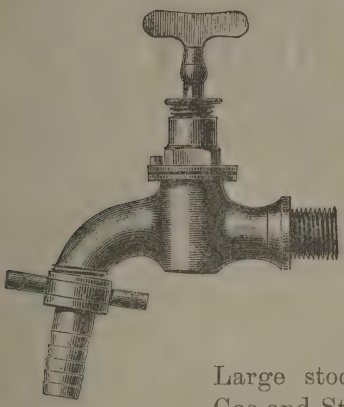
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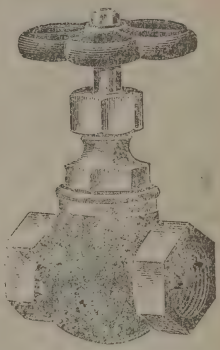
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Steel Plates.
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Large stocks of **TUBES** and **FITTINGS** for Water, Gas and Steam. Catalogues on application.

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THEO. SCHLOSS,

3 & 4, Anglo-African House,
Smith Street, Durban.

P.O BOX **270.**

Telegrams— **'Brokerage'**

BUYS . . **Wattle Bark** AND **Mealies . .** **IN ANY QUANTITY**

FOR

Prompt Cash and Pays Highest Current Market Rates.

It will pay you to communicate with above before selling elsewhere.

TO FARMERS.

Cheap Advertising.

The "Times of Natal."

SPECIAL NEW SCALE

— FOR —

SMALL PREPAID ADVERTISEMENTS

— IN —

PEOPLE'S COLUMNS.

A POPULAR AND EFFECTIVE METHOD OF ADVERTISING.

The "Times of Natal," with a view of still further popularising the paper as a medium for the insertion of "Small" Advertisements, have arranged a REVISED SCALE OF CHARGES for this class of advertisements.

Special Headings are given to **'LIVE STOCK,' 'PRODUCE,'** etc., and thus Farmers' announcements enjoy a particular prominence,

This Scale only applies to advertisements accompanied by remittance. Advertisements of this class, which are not prepaid, will be charged at a higher rate.

SCALE OF CHARGES.

NUMBER OF WORDS.	NUMBER OF INSERTIONS.			
	One.	Three.	Six.	Over Six.
20	1s.	2s.	3s.	
30	1s. 6d.	3s.	4s. 6d.	9d.
40	2s.	4s.	6s.	1s. „
50	2s. 6d.	5s.	7s. 6d.	1s. 3d. „
Every additional 10 Words	6d.	1s.	1s. 6d.	3d. „

Postal Address: P.O. 176, Maritzburg.

FARMERS, STUDY YOUR INTERESTS

By Buying Sound and Reliable Goods.

- - THIS CAN BE DONE - -

By placing your orders with

Telegraphic Address 'Saddlery, Maritzburg

LYLE BROTHERS, Saddlers Harness, and Bag Makers

246, Church Street, Maritzburg.

Whose endeavour has always been to give the best value at lowest possible prices consistent with quality Harness and Saddlery of every description made to order. Large Stocks on Hand.

REPAIRS EXECUTED WITH NEATNESS AND DESPATCH.

Branches—LADYSMITH, DUNDEE, AND VRYHEID

SEED POTATOES.

You can SAVE 50 PER CENT. by ordering your

Potatoes direct from England.

CATALOGUE POST FREE. Agents Wanted. . .

Brinkworth & Sons,

Growers and Shippers,

SOUTHAMPTON, ENGLAND.

HUNT, LEUCHARS & HEPBURN, LTD.,

TIMBER MERCHANTS, . . . DURBAN.

Large Stocks of TIMBER, GALVANISED IRON and a BUILDING REQUISITES.

Estimates given for Wood and Iron Buildings of Every Description and All Classes of Joinery Work.

GRAIN BAGS AND FENCING MATERIAL A SPECIALITY.

P.O. Box 455. **Telegraphic Address: HUNT."**

And at JOHANNESBURG.

P.O. BOX 330. Telegraphic Address: IMPERATOR, Durban.

Karl Schwarz and Calder,

332, SMITH STREET DURBAN.

18, BURG STREET, CAPETOWN.

. . WE ARE . .

Buyers of Mealies

IN ANY QUANTITY

For Cash.

Bankers: Standard Bank of South Africa, Ltd., Durban.

AT LAST!

THE RECOGNISED INFALLIBLE REMEDY FOR WIRE OR HAW WORM IN SHEEP AND GOATS AND PREVENTIVE OF TAPE WORM IN LAMBS. . . .

BERT BOWKER'S CURE.

Trade Mark— A MERINO RAM.

The discovery of a South African farmer. Sure cure for Worms in Horses and Cattle. Has now stood a four years' test and proved right. All orders and enquiries receive prompt attention from:—

M. W. GRADWELL,

Proprietor and Manufacturer,

P.O., CARLISLE BRIDGE, CAPE COLONY.

—:o:—

The cure may be obtained for **2s. per lb. Cash,** from the following Agents in Natal:—

Dundee—A. J. OLDACRE & BROTHER.
Utrecht—H. E. WILLIAMS, Vaalbank.
Vryheid—J. WIGGETT.
Van Reenen and Wyford—Mrs. CATHERINE PORTSMOUTH.

STEWARTS AND LLOYDS (SOUTH AFRICA) LTD.,

MANUFACTURERS OF WROUGHT IRON

TUBES AND FITTINGS

FOR GAS, STEAM, AIR, AND WATER.

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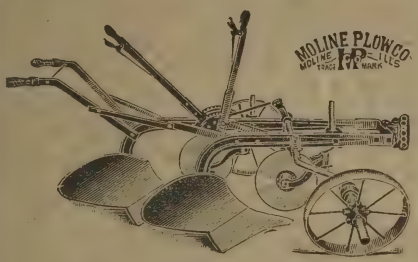
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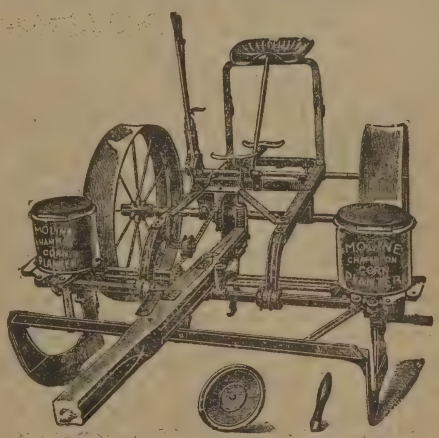
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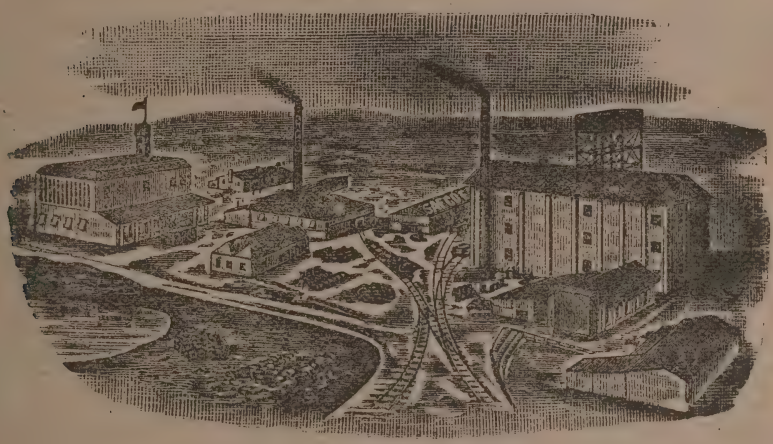
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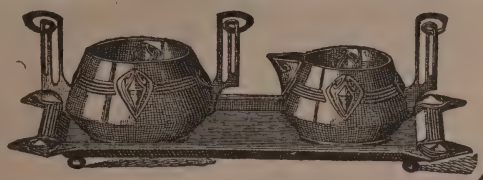
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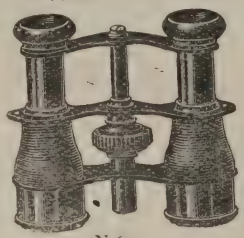
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EPIZOOTIC LYMPHANGITIS.

Showing the appearance of a leg of an animal suffering from this disease.

(An Article on Epizootic Lymphangitis will be found in the present issue of the Journal.*)*

Vol. XIII., No. 4 OCTOBER 29th, 1909.

The Natal Agricultural Journal.

The Colony's Need.

The publication of the Bill "to amend and extend the Agricultural Development Act No 44, 1904," which it is the intention of the Government to introduce during the present Session of Parliament, foreshadows an important step in the agricultural development of Natal. Further than that, it marks a turning-point in the economic history of the Colony.

It might, perhaps, with much truth be said that the progress of farming is measurable by the increasing intensiveness of land settlement. Certain it is that the wealth of a new country under normal circumstances and without taking into consideration the mineral resources of the country, is dependent for its increase upon the increasing settlement of the land, since every fresh settler is a fresh wealth-producer who, by his industry, renders available the latent wealth of the soil. The soil is the capital of a new country; the crops it produces are the interest on that capital. Every man of business seeks to realise the greatest possible amount of interest on his invested capital; and in the same way the State realises to the greatest possible amount of interest must be got out of its land. We have the land, and we must use it to the greatest advantage; for every fresh acre brought under cultivation, by increasing the spending or investing powers of the farmer, and lessening the amount of money sent oversea for foreign supplies, benefits the whole community, and that benefit is increased as more land comes under the plough or is made to carry live stock and as more wealth consequently becomes available for circulation.

It was a realisation of these facts that prompted the framing by

the Government when Mr. Clayton held the portfolio of Agriculture, and the passing by Parliament, of the Natal Agricultural Development Act of 1904, and that brought about the constitution of the Land Board for the purpose of promoting the settlement of the land. The Bill as it was originally framed by Mr. Clayton, however, differed in a most important respect from the Act which finally obtained the sanction of Parliament and became law. The original Bill sought, among other things, to give the Government powers of land expropriation, in respect of unbeneficially-occupied areas, but this was an innovation which, in the eyes of Parliament, amounted almost to a usurpation of individual rights to a restriction of the freedom of the individual, and the section of the Bill which would have conferred these rights on the Government was expunged.

Since then five years have passed, and with the limited resources of land at its disposal, the Land Board, backed by the Government, has worked strenuously to secure the settlement of some of our unoccupied areas, and its efforts have been attended with results of which the Board and the Colony may justly be proud. But the amount of suitable land at the disposal of the Government has steadily diminished, and the position now is that, unless more land be forthcoming, the closer settlement of the country will yearly be attended with greater and greater difficulties, with the probable result, at a no very distant period, of the practical cessation of rural immigration to this country.

The close settlement of the land has in the past been regarded as an ideal impossible of attainment. There was a time in South Africa when it was generally considered that no farmer could possibly keep himself and his family comfortably on less than 4,000 acres of land. This extravagant idea is still held by many, but obviously it is an idea that is chiefly the natural result of an ignorance of anything but the most primitive methods of farming, whether stock or agricultural. Undoubtedly, at the same time, as it must be admitted, there are farms of 4,000 acres or more in this country that could not safely be sub-divided and yield a comfortable living to more than one family, on account of their distance from the railway, the unsuitability of their climate and soil for the growing of the staple farm crops of this country, and various other considerations which militate against the securing of as large a cash return per acre as other farms more happily circumstanced. Proximity to a railway and the existence of tolerable roads constitute the chief factor that governs the yielding capacity of land from a monetary point of view. In other words, the margin of profit on the produce of any given area of land, whether that produce be of an agricultural or of an animal nature, is governed by the cost of transportation to the nearest railway station and by the distance of that land from the chief market; and the close settlement of such land is dependent for the

degree to which it can be carried out upon the annual profit per acre thus yielded by the land. The measure of the annual profit per acre is, however, not entirely dependent upon these considerations. The chief aim of science applied to the operations of farming is to increase the output of every acre utilised. By judicious manuring and by the adoption of correct methods of tillage the yield per acre of the crop grown is increased; by the use of the best machinery money is saved in labour and gained in the increased efficiency of the work performed; by the substitution of more nutritious pastures for the less valuable native grass of our veld a larger number of stock can be kept on a given area and they will yield greater gains in meat and milk; by the provision of fodder for use in the winter the acreage required for the maintenance of stock during that dry period is very sensibly diminished; and by careful observance generally of economical methods throughout the farm the cost of farming is reduced and the average monetary return on each acre is increased.

From these considerations, it is evident that with the efflux of time the settlement of the land must tend to become possible on increasingly intensive lines: as the country is opened up and its various parts are brought into closer touch with each other and with the markets by means of railways, as roads are constructed and old and difficult ones are put into better condition for the purposes of heavy transport, and as the awakening of the farmers to the benefits which science has to offer to the receptive farmer takes place, so the money-yielding capacity of the land is gradually increased, hand in hand with its close-settlement value. This applies as a general principle to most lands, but we have, as we have said, to except lands inaccessibly situated as regards railways or even roads of a nature suitable for heavy transport and unfavourably placed as regards considerations of climate. Such lands perhaps it can never be hoped to see more intensively settled than they are at the present time, but in their aggregate they form but a very small proportion of the total area of relatively intensive farming.

We have just made use of the expression of the words, "*relatively intensive* farming." This brings us to another point which we would not overlook, and which it will be convenient to refer to at the present juncture. We refer to the fact that "close settlement" can only be regarded as a relative term. We have shown roughly how the settlement capacity of land increases as time passes, but at the same time we have shown indirectly that this capacity for carrying settlers becomes greater only very gradually, since it is dependent for its growth primarily upon the two factors of increasing marketing facilities and increasing adoption of scientific methods of farming. When close settlement is spoken of, the idea that arises in the minds of many is the intensiveness of rural settlement that is the characteristic of Great Britain and the European

Continental countries. They look at the small average size of the farms in those countries, and, thinking of the returns per acre which even the best and most favourably situated farmers here obtain, they very pertinently ask whether anyone in his senses expects the subdivision of land in this country to the extent of that which is general in Europe to be attended with anything less than the most disastrous consequences to those who have been sufficiently foolhardy to settle, or allowed themselves to be deluded into settling, upon such small holdings. "Close settlement," however, when it is referred to in relation to Natal or South Africa, does not contemplate the subdivision and settlement of land upon such intensive lines as those which prevail in the United Kingdom and on the European Continent. The fact seems to be overlooked that these countries are the home both of scientific agricultural research and of railway communication, besides possessing good roads that are centuries old, and large urban populations that afford a constant market for immense quantities of farm produce. The conditions in Natal in these respects are relatively primitive, and the settlement of the country must be proceeded with upon correspondingly less intensive lines. That the settlement of the land can very well be more intensive than it is at present, however, cannot but be admitted by anyone who surveys the periodical returns published by the South African Customs Statistical Bureau and notes the large imports of produce which might well be raised on our own farms, or who looks oversea and contemplates the large markets that exist for products which are or could be raised in Natal, and who, finally, casts his eyes over the large areas of land in this country which are not even used for the grazing of stock but which are lying idle and slowly rising in value merely through the efforts of industrious farmers in the vicinity and through the gradual opening up of the Colony generally.

Of such land there are very large areas in Natal—uninvested capital lying idle and yielding no interest, and thus contributing nothing to the well-being of the commonwealth: rather, in fact, serving to retard the progress of the country. That there is a demand for land, the recently issued report of the Land Board shows in a very gratifying way, but the report also points out that practically all the Crown lands suitable for the purposes of closer settlement at the present time have been alienated. In view of this state of things, the enactment of a land expropriation law is not only desirable, but, in the interests of the country's prosperity, really essential; and we sincerely trust that before the present Session is over, Parliament will see its way to grant the Government such expropriation powers as will enable it to acquire suitable land on fair terms for the purpose of subdivision and disposal to new settlers.

Such powers are sought in the Bill to which we referred at the

beginning of this article, but whether Members amend the Bill in some of its respects or not, it is to be hoped that the principle of the measure at least will be affirmed and the power of compulsory purchase be conferred upon the Government.

A glance at the main provisions of the Bill introduced by Government will serve to indicate the tenour of the measure.

The Bill provides for the inspection of any rural lands for the purpose of ascertaining whether they are suitable for acquisition or whether and to what extent they are beneficially occupied, and of valuing them. Upon the recommendation of the Land Board the Governor in Council will have the power to acquire such land by purchase or exchange at a price or value not exceeding that recommended by the Board. Failing that, the land may be taken compulsorily, upon certain conditions; and as this question of compulsory acquisition is an important one we may as well quote the second and third sub-sections of Section 7, as well as Section 8, which give the principles upon which the acquisition of land is proposed to be undertaken. The sub-sections in question of Section 7 are as follows:—

> (2) Save as is provided in sub-section (3) no land (which is being beneficially occupied) shall be taken compulsorily unless there is left to the occupier his residence and industrial buildings, with so much land as is reasonably required for the purpose of his business, having regard to the condition of his business at the time when it is sought to take the land, nor shall any land be so taken the aggregate extent of which, with any contiguous lands held as one block and beneficially occupied, is less than two hundred acres.
>
> (3) The owner or occupier may in any case require that the whole, and not merely a part of the lands held as one block and beneficially occupied, shall be taken, unless the residue is at least one thousand acres in extent.

Section 8 reads as follows:—

> Any owner whose land is compulsorily taken shall be entitled to compensation to be determined according to the provisions of this Act and of the Lands Clauses Consolidation Law No. 16, 1872 which Law shall be incorporated with this Act for any purposes not herein provided for in connection with the compulsory taking of land and the protection of mortgagees, tenants and others having an interest in the lands taken.

In connection with the former of the two sub-sections quoted above, Section 14 may also relevantly be quoted:—

> Where, in connection with the expropriation of land, the question arises how much land is reasonably required for the purposes of the occupier's business, it shall be the duty of the Land Board to determine the same upon enquiry held in the like manner as aforesaid, and the decision of the Board thereon shall be final.

In deciding whether any land is beneficially occupied, the Land Board is to be enjoined to consider (*vide* Section 15) "whether the occupation is such as, having regard to the extent, nature, and situation of the land, and any natural circumstances affecting its use, constitutes

an active and reasonably sufficient utilisation according to civilised methods, for agricultural, pastoral, or industrial purposes or for any lawful purpose of utility or enjoyment." (Note that the last clause guards against the possibility of infringement upon the rights of the individual in the *use* or *enjoyment* of his property.)

The same section as that from which the foregoing is quoted provides that "land owned by a European shall not be deemed to be beneficially occupied if it is occupied by Natives or Indians."

These are the main provisions of the Bill, embodying the principle of the measure The *modus operandi* in the acquisition of lands is also defined in the Bill, but considerations of space preclude any reference to it here, nor would an enumeration or discussion of them add anything to our conceptions of the questions of closer settlement and the expropriation of land—which are the two matters which it was our purpose in the present article to discuss. When the Bill has become law, whether in its present or in a modified form, we shall, in accordance with our usual practice, reproduce in the pages of the *Journal* the main provisions of the measure in common with those of the other acts of agricultural legislation which are this Session added to the Colony's Statute Book. For the present we have to confine ourselves to the urging of the need for the bestowal of expropriation powers upon the Government; and accordingly, with the brief elucidation which we have endeavoured to give of the position in which the Colony finds herself at the present time in regard to land settlement, we leave it in the hands of the more throughtful of our farmers to affirm and in the hands of our Members to legalise by an Act of Parliament the principle of expropriation in respect of unoccupied lands, the adoption of which by the State seems so necessary at the present juncture in the settlement of our country.

With reference to the orders issued by him from time to time prohibiting the removal of cut grass within the Colony, the Minister of Agriculture notifies (Government Notice No. 470, 1909) that the term "cut grass" as used in those orders will not be held to include imported hay or straw used in the packing of goods handed to the Natal Government Railways for conveyance by rail either within the Colony or beyond its borders, provided that the consignment note bears an endorsement by the consignor to the effect that the hay or straw in which the goods are packed is imported, and provided further that the railway official receiving the goods is satisfied that such is the case.



Maize Export.

WE have received from the Port Captain, Durban, the following notes on the export of maize, which will be read with interest. In his covering letter Mr. Rainnie says: "The notes give the situation as it is seen at the Port, but I am not in a position to fix the blame. There are doubtless disabilities which the farmer has to contend with and which should be looked into. In any case every effort should be made to place this product on the high plane its superior quality should command."

The export of maize (the Port Captain writes) is increasing more rapidly than was anticipated, and oversea markets recognise its superior quality. This season's export through Durban to end of September approximates 530,000 bags. Unfortunately, inexperience and perhaps a pardonable want of appreciation of the conditions necessary to safely transport such traffic 6,000 miles oversea are endangering good and stable prices. The difficulties experienced at Durban with this season's crop may be epitomized as follows:—(*a*) Many consignments of wet maize; (*b*) consignments which include bags of dry sound maize and bags of wet maize; (*c*) consignments containing dry and wet maize in the same bag; (*d*) good consignments with one or more bags of sweepings included; (*e*) consignments of, say, yellow maize which frequently include a few bags of other qualities, or half the consignment is other than described. Many bags contain white maize at the bottom and yellow maize at the top, and occasionally Kafir corn helps to fill the bags; (*f*) old and torn bags are still being used by a few senders.

The duty of the Government Grader is simply to certify as he finds, and he cannot transform wet into dry, or bad into good grain. He is required, however, to expose the careless or inexperienced consignor, these people being a danger to the country's prosperity; and farmers' associations should also seriously look into the matter as we have formidable competitors for the world's markets—our mistakes being, of course, their

gain. During the present season Durban stopped 80,000 bags of wet maize, and the authorities provided space free of charge to sun-dry these, but the cost of the labour and also of the tarpaulins to keep the maize off the ground and to protect it from bad weather has been a considerable tax on profits. Government is not likely to treat consignors so leniently next season. A prominent Natal farmer who scorned the idea of forwarding wet maize was convicted of doing so. His explanation was that part of the consignment had been bought from a neighbour, and the latter was brought to the Port and made to acknowledge his fault. In most cases it is recognised that farmers are not wholly to blame, as it has been proved that the merchant and speculator had used much pressure to obtain delivery earlier than the farmer would otherwise have forwarded; but wet and dry maize in one bag, sweepings, and other nefarious practices, are entirely the farmers' affair, and they must be made to see that it is against their interests to continue such abuses. Government is not providing special low railway rates to assist such people, and unless they are stopped, oversea markets will learn to do business with us on lower values.

The Laboratory Dip.

The extensive use which is being made of this preparation is furnishing us with a daily broadening experience as to its value. In most cases the results have been all that could be desired, and from the different reports that have been received—both official and otherwise—users of this preparation are well satisfied. In one or two instances, however, less favourable results have been secured, which appear to have been due chiefly to the uncertainty of composition of the arsenite of soda, which compound is liable to considerable variance in its composition as to the actual amount of arsenic contained. A statement as to the exact strength of such compound should always be obtained from the retailer.

Another point to which attention might be directed is the commencement of dipping or spraying of cattle which have not been accustomed to the use of an arsenical dip or wash. Tolerance to the use of such is rapidly established after the first few applications or dippings. It is suggested, however, that, where no dipping or spraying has been practised in the past, a preliminary trial of the dip upon about five head of cattle should be made, a small quantity of dip (say about fifty gallons)—made by using $\frac{1}{8}$ of the quantities recommended for 400 gallons—being mixed for the purpose. This trial fluid could be applied either by pouring, syringing on, or washing the beast with the solution, and if any appreciable degree of stiffness was found to follow within a

few days of such application, a further test might be made by using, say, four bucketsful of the dip mixed with another bucketful of the water, and applied to a further five head in the same manner.

In this way the exact strength of the dip suitable for the first dippings of a susceptible herd could be arrived at without much trouble, and the composition of the dip for first use adjusted, increasing the strength up to the standard as laid down after the first two or three dippings. This would be an easy matter which could be arranged by simply making good the loss by evaporation and use, from time to time, by using standard strength fluid. It must always be remembered that the destruction of tick life as completely as possible is the point aimed at, and this desideratum cannot be secured except by the use of arsenical solutions of considerable strength. As stated above, however, a beast rapidly attains a tolerance to such application, and the above preliminary adjustment is only suggested in cases where no dipping or spraying has been practised. Such instances, however, form a very small part of the whole, and in cattle habituated to the use of dipping, the formula as given is attended by the best results. If any distress is noticed at first in working oxen, it would be as well to make the mid-day outspan as long as possible by earlier and later working, a measure which our lengthening days renders possible.

Enquiry for Maize Husks.

An enquiry has been received by the Department of Agriculture from a gentleman in Capetown as to the possibility of obtaining mealie husks on a large scale for the purpose of fruit packing. His letter is of sufficient interest to reproduce here. "A friend of mine in Manchester," he writes, "thinks there is an opening for a trade in the leaf which enwraps the mealie cob (not the mealie leaf), and writes me as follows: 'The other day I got some fruit from Jamaica packed in these leaves, and a man who was in my office when some was being unpacked saw these shavings, as he called them, and after examining them said:—"If this can come over dry it will make suitable packing. Can you let me have a quantity of it, and at what price? I should require it packed in 300 lb. bales, tightly packed, like compressed hay, and delivered to Durban ready for transhipment, perfectly dry and in good condition. As regards quantity, 500 bales could be taken at once if price were right, and increasing quantities in the future."' I shall be greatly obliged if you can give me the addresses of large growers or dealers in your Colony, so that I may write to them and find out if there is any chance of doing business." The writer of the letter has been communicated with by the Department, but should any of our readers desire to get in touch with him direct we shall be glad to furnish his name and address.

Argentine International Exhibition, 1910.

The Minister of Agriculture has received a communication from the President of the Argentine Rural Society asking him to bring to the notice of the various agricultural associations and other bodies interested in farming, the fact that it is proposed to hold an International Exhibition at Palermo (Buenos Aires) from the 3rd June to the 31st July of next year. The exhibition is to be held under the auspices of the Government of the Argentine Republic, in celebration of the First Centennial of the Argentine Emancipation (May 25th, 1810). Persons interested who may wish to send exhibits to the Exhibition should communicate iwth the Secretary, Mr. E. M. Nelson, whose address is Florida 316, Buenos Aires. The date fixed for receiving applications from abroad for entries, space, etc., is the 1st December next.

A South African Book on Bee-Keeping.

A book on bee-keeping has recently been issued by the Cape Department of Agriculture, from the pen of Mr. H. L. Attridge. The book is cloth bound and well illustrated, and should be in the hands of all S. A. bee-keepers, and those commencing this pursuit. The author is well known throughout South Africa as an expert, lecturer, and practical apiculturist. By way of introduction the early chapters of the book are devoted to such subjects as the early history and progress of apiculture, its educational aspect, and as recreation for mind and body. The commercial side of bee-keeping is also touched upon. After dealing with the natural history of the honey bee the author describes the different races of bees, enumerating the good and bad points of some of the best known varieties. The South African bee is fully discussed, and certain recommendations are given to guide the beginner in selecting the most suitable kind of cultivation. The anatomy and physiology of the honey bee forms an interesting chapter. The practical management of bees is very lucidly explained, several original illustrations being introduced to assist the beginner and less advanced apiarist. Various patterns of hives and appliances suitable for S.A. conditions are illustrated and explained. Chapters on the Location of the Apiary, Subduing and Handling Bees, Driving and Transferring, Swarms, After Swarms, Artificial Swarms, Prevention of Swarming, Uniting Bees of different Colonies, Modern Methods of Queen Rearing, Feeding Bees, Introducing Queens, Robbing by Bees, Diseases of Bees, etc., are also included. All the methods advocated are given by the author as the outcome of several years experience and close study of bee life. The work is now on sale at the leading booksellers in Cape Colony, and can also be obtained on application to the Government Stationery Department, Capetown. It is also obtainable in Dutch.

Trypan Blue.

"Farmeress" has written asking certain information regarding trypan blue, but has omitted to sign her name. We would ask correspondents to note that all communications to us should be accompanied by their name and full address, together with, if desired, a *nom-de-plume* to be used in case the letter is of sufficient general interest to warrant its publication. As a rule we take no notice of anonymous letters, but as the letter before us appears to come from a reader who is unacquainted with the rules of press correspondence, we make an exception in the present case. "Farmeress" writes: "I have read all notes on ticks; can you please tell me how much trypan blue is sufficient for one animal and if kept by all chemists? I am interested in stock and should like to try it."—As far as we are aware, trypan blue has not been used in this Colony, at least to any extent, nor can we say what the dose for cattle is. So far as we know, however, this dye is of little value as an insecticide. "Farmeress" may be able to obtain trypan blue at one of the leading chemists, if she wishes to try it; otherwise they would probably be able to import it for her

Mushroom Culture.

The following information regarding the culture of mushrooms has been furnished by Messrs. R. Mason & Son, 289, Church Street, Maritzburg, who state that they are in a position to supply large quantities of Colonial made and guaranteed fresh spawn. Mushrooms can be grown in any cool shady situation, such as a stable or dug-out cellar, where an even temperature can be kept. The heat must not be less than 50 or higher than 57 degs. This must be kept moist by occasional syringing. The beds must be well drained, however, to carry off all excess of moisture. Collect fresh horse manure, or better still use 2 parts of horse and 1 of cow, and well mix together. Let it remain in a heap until it heats, usually three or four days. Then turn every second day until there is no objectionable smell each time it is turned; take care that the outsides and tops go into the inside. This operation may take a week or more according to the size of the heap. The idea is to allow all the gases to escape, which cannot be done unless the manure is well heated. Make a foundation of loose rubble or cinders, the latter are the better, about 2 inches deep, making with a slight fall to allow for drainage. Now place the manure in even layers pressing it down until it is 12 to 15 inches high. Beds 3 feet wide are the easiest to handle. If it is made properly the temperature will go up to 105 degs., but it must be allowed to remain probably three or four days until the heat falls to 70 degs.

Take a brick of spawn and break it into eight pieces, insert the pieces just under the surface, covered, about 12 inches apart. Let

them remain for three or four days and examine if it is running; this can be seen by taking a small piece of manure from alongside the spawn and noticing if there is a kind of white dew in the manure; if so everything is satisfactory so far. Now get some good soil and mix into a plaster and spread the bed over 1 inch thick. Cover over the plaster with long manure, and if the atmosphere is at all dry keep it moist. Should the atmosphere be kept in the right condition, as previously directed, this watering may not be necessary. It must never be wet, only moist. From the time of spawning, it generally takes about six weeks for the mushrooms to appear.

Cape and East Coast Fever.

A Proclamation has been issued by the Cape Government notifying that, from and after the 15th September, 1908, the District of Bizana shall be taken and deemed to be a suspected district, and that the following Regulations shall have the force and effect of law, *viz.*:—(1). It shall not be lawful to remove, or cause or allow to be removed, or permit to stray, any horned cattle from or into the said District of Bizana. (2). If any horned cattle be removed or introduced into the District of Bizana from any of the adjoining districts of the Transkeian Territories, it shall be lawful for the Headman of the Location in which such cattle may be found to take them in charge with a view to isolating them as completely as circumstances permit, and to detain them in such isolation until such time as the Resident Magistrate of the district or other officer appointed thereto by him in writing shall, after due enquiry into the circumstances of their removal, introduction or entry, issue instructions for their disposal, and such cattle shall be disposed of in accordance with such instructions. (3) It shall not be lawful to introduce any transport wagons or goods into the said district of Bizana save and except through the port of entry hereby established at Nqabeni Drift, provided that the horned cattle which have drawn such wagons or goods thither shall first have been outspanned on the Flagstaff side of the boundary, and that such horned cattle shall not themselves be introduced or utilised for the introduction of such wagons or goods into the said district. (4) It shall not be lawful for any human being, animal, article or thing, to cross the Border from the District of Bizana into the Colony of Natal save and except through Middledrift, at which place human beings on foot shall be permitted to cross the Border with their personal effects. Any person contravening the provisions of the foregoing Regulations, or interfering with or molesting any officer, Headman or other duly authorised person in the performance of any duty imposed by this Proclamation shall be liable on conviction to a fine not exceeding fifty pounds sterling (£50) or, in default of payment, to imprisonment, with or without hard labour, for any period not exceeding three months, unless such fine be sooner paid.

Farm Telephones.

In connection with the correspondence *re* the establishment of a system of farm telephones for South Africa, which we published last month, the General Secretary of the South African National Union now forwards the following minute by the Acting Postmaster-General of the Transvaal which has been sent to him by the Director of Agriculture, Pretoria:—"With reference to your minute (No. 13,017) of 16th inst., I beg to inform you that the current year's programme of country telephone exchanges includes the establishment of exchanges at Standerton, Belfast, Volksrust, Barberton, Ermelo, Middleburg, Rustenburg, Litchenburg, Wakkerstroom and Potgietersrust, and the enlargement of the exchanges at Heidelberg, Witbank and Vereeniging. There are already several other country exchanges. It is intended to erect main trunk lines to communicate with Pretoria and the Rand from Klerksdorp, Volksrust, Belfast, Zeerust, and Pietersburg. Connected with these main routes will be a large number of subsidiary trunk lines, and when the whole are erected it will be possible to speak easily from one end of the Transvaal to the other. Few farms will be far removed from a line when this programme is completed, and connections with farms will be given to the nearest available point on the lines.

All connections will be taken to an exchange. The exchange fixed charge of £7 10s. per annum will be payable by all subscribers, and the only addition to this for farmers will be ten per cent. of their lines outside exchange areas, existing lines being used as far as possible to minimise this cost. If, for instance, a farm is ten miles from an exchange, a trunk line from the exchange passing within two miles of the homestead, the charge would be £7 10s. for the exchange service, covering a line of one mile from the exchange as centre; for seven miles the circuit would be carried on the existing line, and for the remaining two miles a light line would be run across-country to the homestead, 10 per cent. of the cost of this construction outside the exchange area being added to the subscription of £7 10s. If two farmers become co-renters of a circuit, or if the cross-country line serve two or more farms, the yearly cost will be correspondingly lowered. In practice it will be found that this system of charge will lead to cheap telephones. Private lines between farms will also be erected, if required; but it is found that nearly all farmers wish to use the trunk lines to get into communication with their markets. The yearly subscription will cover a service to all their exchange subscribers, but for trunk line services there will be a charge of 3d. per conversation over each 25 miles of line. The arrangement in regard to these charges is experimental, and as soon as possible a fixed scale will no doubt take its place."

Articles on Farm Machinery.

Contrary to our expectations, we have found it impossible this month to publish the first of the articles on farm machinery which we promised last month, owing to the great demands we have experienced upon our space. We have much matter in hand for next month also, but hope to be able to include the first of these articles in that issue. With one or two minor exceptions all the firms we approached for assistance in the preparation of these articles have responded well, and we believe that the series will be an unique as well as a very useful one.

New Bills for Parliament.

A number of Bills relating to the farming interests of the Colony are being brought before Parliament this Session. The most important of these—"to amend and extend the Agricultural Development Act, No. 44, 1904"—we refer to at length elsewhere in this issue. This Bill seeks to obtain for the Government powers of expropriation in respect of lands not beneficially occupied. Of the others, two have at the time of writing passed the second reading in the Lower House, *viz.*, (*a*) "To control the introduction and to regulate the disposal of exotic animals and animal products," and (*b*) "to regulate the importation of animal manures." The former of these subjects the importation and sale of animals and animal products to such regulations as may from time to time appear advisable for the prevention of the introduction or spread of diseases: and the second Bill confers upon the Governor in Council similar powers as regards the importation of animal manures. A third Bill, which would have assisted in placing our nascent ostrich industry at once upon a high plane as regards the quality of its produce, was thrown out by the Lower House. By means of another Bill the Government seeks to increase its borrowing powers under the East Coast Fever Act, No. 53 of 1906, and providing for the advancement by the Public Debt Commissioners from the Consolidated Loans Fund of any sum up to £10,000 in addition to the sum of £100,000 authorised by Act No. 53 of 1906. Another measure to be brought forward is one which provides for the amendment of Section 28 of the Land and Agricultural Loan Fund Act, No. 27, 1907, a proviso being added to that section to the effect that, where an application is made for a loan for the purpose of paying off an existing bond, an advance may be made of the amount due under such bond upon a cession of the bond to the Board pending the registration of a new bond in favour of the Board. In accordance with our practice we will, if space permits, publish the main provisions of all the measures affecting the farming interests of the Colony which finally become law.

S.A. Maize Brochure.

We have received from the General Manager of Railways a copy of a brochure on maize cultivation and export, which has been prepared under the auspices of the Governments of South Africa. The objects of the pamphlet are to induce more extensive cultivation of this important crop by the farmers of South Africa and to make more widely known the quality and peculiar advantages of South African maize to the European buyer and consumer, and with these objects in view concise and practical information is given relative to markets, transport facilities (special rail and sea freights), conditions of low export rates, grading arrangements, insurance, ruling prices—European markets, bagging —sizes and weights of bags, etc., marking of bags, selling maize, C.I.F., export arrangements—preparation of bills of lading and other documents, cable payments, storage at port of shipment, maize samples, steam machinery with some hints to growers, whilst for the benefit of buyers information is also given regarding maize seasons, together with descriptions of maize and some notes on additional uses of the maize crop. In all, the brochure covers 55 pages and contains over 30 excellent illustrations; the pamphlet is, in fact, a work of art from beginning to end, and the printers (the N.G.R. Printing Works) are to be congratulated upon what is a noteworthy contribution to artistic printing in South Africa. Much credit is due also to the compiler, Mr. A. H. Tatlow, of the Publicity Section of the Natal Government Railways, for his share of the work of producing the brochure, which is as remarkable for the clearness and conciseness with which the matter is set forth and the essential facts are brought out, as it is for its artistic appearance. We understand that the brochure is being widely but at the same time judiciously distributed, and we may confidently predict a very material increase in the production and trade in the product with which it deals as a result of its timely appearance at the present stage of our export trade.

Cape Border Ports of Entry.

The Cape authorities have withdrawn Proclamation No. 373 of 1909, defining the Ports of Entry on the Cape-Colony-Natal Border for the introduction into Cape Colony from Natal of certain live stock and articles, and have substituted another therefor (No. 431, 1909), under date 16th October. This new Proclamation provides that the Ports of Entry enumerated in the schedule hereof [reproduced at the end of this note—ED.] shall be the sole Ports of Entry on the Cape Colony-Natal Border for the admission into this Colony from Natal, in the manner described in such schedule, of human beings, live stock and the articles or things specified in regard to each Port respectively." It is further provided that "Nothing in this Proclamation contained shall be deemed to affect the validity of the prohibition imposed by my Proclamation No.

116, dated 12th March, 1909, on the introduction of vehicles and goods drawn to the said Border by horned cattle through the Ports of Entry at Standford's Drift and Union Bridge."

The Proclamation proceeds: Notwithstanding anything to the contrary contained in Proclamation No. 187 of 1899, as amended by Proclamation No. 428 of 1908, it shall not be lawful for any person, without the authority of the Minister previously obtained, to pass through or over any of the fences erected along the Natal Border from the Drakensbergen to the mouth of the Umtamvuna River, except through the Ports of Entry enumerated in the schedule hereto, or over a stile, and, in the latter case, only for the sole purpose of procuring water from the Ingwangwane, Indowanee, Umzimkulu or Umtamvuna Rivers, and further, that all persons crossing such stiles, or entering through the Ports of Entry aforesaid, shall be liable, when so required by the officer or non-commissioned officer in charge of the Cape Mounted Riflemen or guard acting under his orders, to be searched and examined for the possession of any article or thing, the introduction whereof into this Colony from Natal is or may hereafter be specially prohibited. Any person contravening the provisions of this Proclamation shall be liable, on conviction, to a fine not exceeding fifty pounds, or, in default of payment, to imprisonment, with or without hard labour, for any period not exceeding three months, unless such fine be sooner paid."

The following is the schedule referred to in the Proclamation:—PORTS OF ENTRY INTO EAST GRIQUALAND.—(1) *Stanford's Drift*: For human beings, equines used solely for transport purposes, and all articles or things whereof the introduction is not specially prohibited. (2) *Riversdale*: By *rail* only for all live stock, other than cattle, sheep and goats and all articles or things whereof the introduction is not specially prohibited and which are not conveyed in cattle trucks, and also for human beings, and equine transport used solely for the conveyance of passengers and other personal effects. (3) *Union Bridge*: For human beings, all live stock, other than cattle, sheep and goats, and all articles or things whereof the introduction is not specially prohibited, provided they are not removed beyond the boundaries of the district of Umzimkulu, Ingeli Gate and Harding Gate, for human beings, and their personal effects, and mail bags only, under the supervision of the Border Guard.—PORTS OF ENTRY INTO PONDOLAND.—*Middledrift*: For mail bags only, under the supervision of the Border Guard. [N.B.—Prohibited articles or things comprise animal produce, grass, hay, reeds, rushes, herbs, plants or other vegetable matter, but do not include vegetables, fruit, cereals, or cultivated plants, provided such are not packed in grass, hay, reeds or rushes.]

Natal's Progress in 1908.

By H. J. CHOLES, F.S.S.

THE compilation of the agricultural statistics of Natal for the year 1908 has now been completed by the Colonial Secretary's Department and published in the *Statistical Year-Book* of the Colony; and, following the plan of previous years, I propose to examine the published results, in conjunction with the figures compiled by the South African Customs Statistical Bureau at Capetown, and endeavour to ascertain what light they throw upon the progress of the Colony during the year to which they refer.

I.—THE RAINFALL.

Before, however, we commence our study of the agricultural progress which has been made during the year, it will be interesting to study the rainfall of the year, and a satisfactory method of doing this is to ascertain the average annual rainfall of the previous ten years, 1898-1907, and the average number of days annually on which rain fell, for such of the stations for which statistics are published, and compare these figures with the corresponding figures for 1908. Such a comparison is offered in the following table:—

THE RAINFALL.

Table showing the Rainfall during the year 1908, as compared with the average annual fall for the previous ten years, at certain centres.

Station.	Average Annual Fall 1898 1907.	Rainfall in 1908.	Average No. of days per Annum on which rain fell 1898-1907.	Number of Days in which rain fell in 1908.
Coast:	Inches.	Inches.		
Durban	39·09	45·91	161	163
Stanger	37·96	45·43	181	173
Verulam	35·90	43·20	110	124
Port Shepstone	43·99*	52·76	127*	94
Umzinto	37·41†	53·18	86†	76
Midlands:				
Richmond	40·00	43·53	133	157
Pietermaritzburg ...	35·32	32·53	130	149
Howick...	31·40	35·06	134	123
Greytown	33·49	42·00	127	135
Uplands:				
Weenen ...	24·48‡	31·52	88‡	107
Estcourt	28·19	28·64	83	76

* Average for seven years. † Average for nine years. ‡ Average for eight years.

As will be seen, I have arranged the figures according to the geographical positions of the stations to which they refer, which will facilitate comparison, not only of the rainfall of 1908 with that of previous years, but also of the varying rainfall of the different geographical belts or terraces of the Colony.

A study of these figures shows that last year was on the whole a wetter year than usual, particularly on the Coast. In some of the inland districts, too, considerably more rain fell than usual. No generalisation can, however, be made with regard to the comparative number of days on which rain fell, as the figures given vary from station to station.

II.—SIZES OF HOLDINGS.

The *Statistical Year-Book* throws no fresh light on the question of the relative sizes of farms, and I do not think I can do better, as the matter is of perennial interest, than re-state the conclusions I arrived at in my examination last year of the figures given in the 1907 *Year-Book*. In the study I then made, it may be remembered, I assumed that there were approximately 4,000 farmers in the Colony, and using the figures in the 1907 *Year-Book* as a basis, I classified the farms of the Colony according to their respective areas, calculating the approximate number of holdings in each class. I repeat here the results I obtained, and I have added also a column giving the percentage which the number of farms in each category bears to the total number of farms in the Colony:—

	No. of Farms.	Per cent. of Total.
1— 50 acres	151	3·78
51— 100 ,, ...	132	3·30
101— 200 ,, ...	158	3·95
201— 500 ,, ...	493	12·32
501—1,000 ,, ...	683	17·07
1,001—2,000 ,, ...	1,143	28·58
2,001—3,000 ,, ...	602	15·05
3,001—4,000 ,, ...	369	9·22
Above 4,000 ,, ...	269	6·73
	4,000	100·00

From this statement it will be seen that nearly 29 per cent. of the farms of the Colony range in area between a thousand and two thousand acres.

Remarking upon these figures, in my last year's article, I was able, by a few simple calculations, to give some idea of the extent to which agriculture pure and simple and stock farming, respectively, are carried on in the different geographical belts of the Colony; and it may be useful to repeat what I then wrote on the subject:—

"It may be of interest to note that 10·7 per cent. of the farms are situated on the Coast Belt of the Colony, 33·1 per cent. are situated in the Midlands, and 52 per cent. in the Uplands, the remainder belonging to Zululand, and we can now gather some idea of the extent to which agriculture pure and simple and stock farming, respectively, are carried on in the different geographical belts—Coast, Midland, and Upland. Calculating upon the same basis as before, we find that the approximate number of farms in the Coast Belt in 1907 was 430. These farms between them covered about 444,000 acres and cultivated 106,143 acres, or 24 per cent. of their total area. In the Midland Belt there were approximately 1,324 farms, covering about 2,151,740 acres and cultivating 153,719 acres, or 7·2 per cent. of their total area. The Upland Belt contained 2,080 farms or thereabouts, ranging over 4,494,240 acres and cultivating between them 81,354 acres, or 1·8 per cent of their total area. On the other hand, the farms on the Coast Belt carry under 2 per cent. of the total live stock (horses, cattle, and sheep) of Natal, whilst the Midland farms account for just over 32 per cent., and the farms in the Upland Belt 66 per cent. Whilst there are purely agricultural farms in the Midlands and Uplands, it is thus only the Coast Belt which, speaking generally, can be described as agricultural in the real sense of the word. In the midlands the farms are 'mixed'—that is, devoted partly to agriculture and partly to stock raising—although the tendency is towards stock farming; whilst in the Uplands stock farming preponderates."

The results of the above calculations may be given in tabular form for the sake of clearness:—

	Cultivated Area (Percentage of Total Farm Area).	Live Stock (Percentage of Total in Natal).
Coast Belt	24·0 ...	1·9
Midland Belt	7·2 ...	32·1
Upland Belt	1·8 ...	66·0

III.—CROPS AND CROP PRODUCTION.

A comparative study of agricultural statistics affords direct evidence of the progress of farming, and for the purpose of facilitating such study I have prepared tables giving the totals for the years ended 30th June 1907 and 1908 respectively. The first of these tables deals with the raising of crops, showing the number of acres cultivated and the produce reaped in each of the two years:—

CROPS.

Nature of Crop, Number of Acres of Land under each Crop, and Quantity or Value of Produce obtained, during the years 1906-7 and 1907-8.

Description.	Area Cultivated.		Produce Reaped.	
	1907-8	1906-7	1907-8	1906-7
	Acres.	Acres.		
Arrowroot	16	19	70 cwt	40 cwt
Barley for Grain	633	639	2,231 muids	1,729 muids
Beans	2,232	1,575	6,125 ,,	4,588 ,,
Buckwheat	441	352	1,184 ,,	1,144 ,,
Cayenne Pepper	32	25	15,950 lbs	12 199 lbs
Coffee	120	138	19,454 ,,	28,200 ,,
Cotton	128	206	19,080 ,,	15,935 ,,
Earth Nuts	225	94	1,874 muids	652 muids
Exotic Grasses	4,337	3,367	2,109 tons	1,132 tons
Green Crops for Fodder :—				
Barley	2 568	2,258	4,205 ,,	2,484 ,,
Millet	2,481	2,178	3,091 ,,	2,044 ,,
Oats	6,768	5,728	7,206 ,,	6,331 ,,
Sugar Cane ...	1,459	1,276	6,186 ,,	6,789 ,,
Other Green Crops ...	1,624	1,382	2,245 ,,	1,600 ,,
Hay	1,568	1,939	17,745 ,,	17,202 ,,
Kafir Corn	6,485	6,768	26,782 muids	28,424 muids
Lucerne	1,041	637	701 tons	482 tons
Mealies...	139,413	117,750	664,270 muids	555,432 muids
Millet for Grain	472	522	1,753 ,,	884 ,,
Oats for Grain	562	515	1,986 ,,	1,590 ,,
Onions	171	189	5,225 ,,	6,409 ,,
Orchards	35,912	35,686	—	—
Fruit Sold	—	—	£52,627	£37,957
Fruit Canned	—	—	£2,099	£1,992
Fruit made into Jams and Jellies	—	—	£1,633	£1,666
Peas	414	277	1,280 muids	850 muids
Potatoes	5 541	5,342	152,435 ,,	143,433 ,,
Pumpkins	864	984	1,280 tons	1,257 tons
,, ...	—	—	*4,658 ,,	*4,878 ,,
Sugar Cane, total area under Crop	52 187	51,260	—	—
Sugar Cane, cut during year.	14,627	13,549	—	—
Sugar		—	35,832 sh. tns	27,130 sh tns
Molasses	—	—	3 835,090 lbs	3,245 820 lbs
Sunflower	327	181	1,237 muids	685 muids
Sweet Potatoes	1,570	1,363	60,190 ,,	46,810 ,,
Tea	5,502	5,226	3,278,464 lbs	2,065,838 lbs
Tobacco	667	600	304,916 ,,	301,509 ,,
Turnips and Swedes ..	1,248	1,294	4,731 tons	4,801 tons
Vegetables	582	599	£3,019	£2,706
Wattles — Total area under cultivation	108,444	89,928	—	—
Wattles planted during year...	11,822	8,161	—	—
Wattle Bark sold ...	—	—	14,758 tons	11,846 tons
Wattle Timber sold ...	—	—	£13,617	£13,991
Wheat	381	370	1,093 muids	1,058 muids
Winter Fodder—Area set aside for	7,132	6,373	—	—
Other Crops	1,076	282	—	—

* Pumpkins grown with maize.

These figures disclose some interesting facts. As will be more fully commented upon elsewhere, the green fodder crops, such as barley, millet, oats, sugar cane for fodder, lucerne and exotic grasses, show appreciable increases as regards the area of land devoted to their cultivation. The aggregate increase is to the extent of 2,482 acres, or 18·4 per cent. over the area for 1907. The area under lucerne shows an increase of 63 per cent., which is indicative of the increased interest which is being taken in this important fodder-plant.

The areas under beans, earth-nuts, mealies, potatoes, sugar cane, sunflower, tea, and wattle bark have all increased materially, while the area set aside for the production of winter fodder has increased by about 760 acres. The area of land under sugar cane has increased by over 900 acres, and the production last year amounted to 8,700 short tons more than that of the preceding year. A fair increase is also to be noted in the area under tea, whilst the production has gone up by over 1,200,000 lbs., which is a particularly gratifying increase. The cultivation of wattles continues to increase, 11,822 acres being planted in 1907-8, as compared with 8,161 in 1906-7. The total area, it will be noticed, now stands at a little over 108,400 acres. The increases recorded in earth nuts and sunflower are doubtless due to the fact that farmers are coming more to realise that there is a fair market for these products in Natal, for the manufacture of soap; whilst undoubtedly the increase in the area under sweet potatoes is traceable to the establishment of the starch factory at Umgeni. Cotton unfortunately shows a material decrease in area, though the production was greater than in 1907; and coffee shows not only a reduced area, but also a smaller crop. The production of cayenne pepper has increased by 3,700 lbs., and the area has been extended to 32 acres.

This brief survey will suffice for the present, since I propose to deal more fully with crop production later on when I come to study each crop or group of crops individually. In passing I may add that the total area of land under cultivation by Europeans in 1908 was 390,209 acres, as compared with 347,900 acres in 1907 and 321,793 in 1906. I have already mentioned the crops to which are due the increased area under cultivation last year.

For the manuring of these crops our farmers used £36,071 worth of fertilisers imported in 1907 from oversea and from other parts of South Africa, besides quantities of fertilisers manufactured in Natal. In 1906 the imports of fertilisers amounted to £20,643; whilst last year £23,280 worth were purchased from oversea and other parts of South Africa.

The average yield per acre of each of the principal crops grown in the Colony during 1908, as compared with 1907, was as follows:—

	1908	1907
Barley (grain), muids	3·7	4·0
Barley (forage), tons	1·6	1·8
Beans, muids	2·9	3·0
Buckwheat, muids	2·7	3·6
Kafir Corn, muids	4·2	4·1
Mealies, muids	4·9	4·7
Millet (grain), muids	3·7	3·6
Millet (forage) tons	1·2	1·7
Oats (grain), muids	3·4	4·2
Oats (forage), tons	1·1	1·4
Onions, muids	30·0	24·4
Peas, muids	3·6	3·6
Potatoes, muids	25·6	24·9
Pumpkins, tons	1·8	1·8
Sugar, tons	2·3	1·7
Sunflower, muids	4·2	3·9
Sweet Potatoes, muids	29·6	27·2
Tea, lbs.	595·9	663·0
Tobacco, lbs.	750·0	650·8
Turnips, tons	5·2	4·7
Wattle Bark, tons	4·0	4·0
Wheat, muids	3·3	3·2

The area of land under irrigation in 1908 was 15,668 acres, as compared with 13,744 acres in 1907 and 13,871 in 1906. This is an interesting increase, and is another indication of the manner in which the character of our farming is improving.

The use of farm implements and machinery and other mechanical accessories is reflected in the following table, which gives comparative figures for the last three years:—

AGRICULTURAL IMPLEMENTS AND MACHINERY.

Statement showing Numbers of Agricultural Implements, Machines, and other Accessories in possession of Europeans on August 31st, 1906, 1907, 1908, respectively.

Description.	1906	1907	1908
Baling Machines	469	537	568
Carts	2,341	2,405	2,638
Wagons	2,975	3,193	3,222
Chaff Cutters	1,016	1,021	1,097
Cream Separators	910	1,015	1,068
Cultivators, Horse-hoes, etc.	4,509	4,361	4,428
Dipping Tanks—Cattle	103	118	167
,, ,, Sheep	336	359	321
Engines and Turbines	339	341	384
Harrows	3,730	3,889	4,103
Hay Rakes	816	837	849
Hydraulic Rams	146	139	142
Incubators	325	447	517
Mealie Mills	2,083	2,086	2,262
Mealie Planters	879	868	976
Mealie Shellers	1,989	2,027	2,077

AGRICULTURAL IMPLEMENTS AND MACHINERY.—*Continued.*

Description.	1906	1907	1908
Mowing Machines	1,100	1,103	1,121
Ploughs	8,687	9,327	8,988
Potato Planters	114	114	124
Reapers	171	183	159
Silos	41	37	53
Windmills	120	120	119
Winnowers	442	453	444
Other Implements	257	364	454

In most of the categories there are increases observable, and, while these increases are not in the majority of cases large, the table shows a satisfactory state of affairs taking it on the whole. It is interesting to note, in this connection, that imported machinery to the value of £22,957 was sold to Natal farmers in 1908, as compared with £36,900 worth in 1907 and £13,637 worth in 1906.

Before passing on to the next section of our subject, a few remarks regarding labour employed by farmers during 1907-8 will not be out of place here.

The number of natives employed by farmers in 1908 was 16,086 men and 3,675 wmoen. Of indentured Indians there were 14,115 men and 5,172 women employed; whilst 1,338 free Indian men and 263 women were also employed. European farm hands to the number of 550 were also employed. In order to shew the changes which have taken place during the last three years as regards the employment of Natives and Indians, respectively, on our farms, I have drawn up the following statement, which covers as wide a period as the statistics available permit:—

COLOURED LABOUR.

Table showing number of Natives and Indians employed on Farms during the Years 1906, 1907 and 1908 respectively, and the percentage of increase or decrease in the numbers employed in 1908 as compared with 1906.

Category.	1906	1907	1908	Increase or Decrease per cent. : 1906-1908
Natives :—Men	14,310	14,956	16,086	12·5 increase
Women	3,426	3,273	3,675	7·3 ,,
Total Natives ...	17,736	18,229	19,761	11·5 ,,
Indians :—Indentured—Men ...	10,345	10,446	14,115	36·5 ,,
,, Women ...	3,951	4,208	5,172	31·0 ,,
Free—Men	1,235	1,169	1,338	8·4 ,,
,, Women ...	170	182	—	100·0 decrease
Total Male Indians ...	11,580	11,615	15,453	24·9 increase
Total Indians ...	15,701	16,005	20,625	31·4 increase

It will be seen from this statement that, whereas the number of Native men employed on farms has increased by under 13 per cent. since 1906, the number of indentured male Indians has increased by over 36 per cent., whilst the number of free male Indians (an increase in whose number would be preferable to an increase in the number of indentured Indians) has increased by a little over 8 per cent. only. With regard to women also there is a noteworthy difference in the increases: 7·3 per cent. in the case of Native women, and 31 per cent. in the case of female indentured Indians.

The average wages of Natives per month in 1908, as compared with 1907, were as follows (the 1907 figures are shown in brackets after the 1908 figures):—

NATAL.—*Coast Belt*: Men, 17s. 6d. (19s. 1d.); women, 6s. (6s. 9d.). *Midland Belt*: Men, 15s. (14s. 10d.); women, 7s. 6d. (8s. 7d.). *Upland Belt*: Men, 12s. 6d. (12s. 4d.); women, 6s. (5s. 8d.).

ZULULAND.—*Coast*: Men, 20s. (15s.); women, 7s. 6d. (5s.) *Inland*. Men, 18s. (12s.); women, 7s. 6d. (4s.).

The average wages for the whole Colony were: Men, 15s. (14s. 8d.); women, 7s. (6s.).

IV.—THE LIVE STOCK OF THE COLONY.

The numbers of live stock in the Colony, in the possession of Europeans, in 1907 and 1908 respectively are shown in the following table:—

LIVE STOCK.

Live Stock in the Possession of Europeans on August 31st, 1907 and 1908.

Description.	1908	1907
Stallions, Imported...	187	162
Stallions, Colonial	879	735
Brood Mares	10,005	9,676
Saddle and Draught Horses	11,463	10,872
Other Horses	9,643	8,899
Mules	4,274	2,370
Donkeys	5,370	2,385
Bulls, Imported	144	159
Bulls, Colonial	3,772	3,900
Cows	75,790	78,537
Oxen	59,275	62,816
Other Cattle	81,432	82,336
Cattle available for Slaughter	23,083	24,599
Rams, Imported	417	368
Rams, Colonial	11,331	10,084
Sheep, Woolled	665,222	574,068
Kafir Sheep	63,423	58,039
Persian Sheep	24,984	18,907
Sheep available for slaughter	64,162	67,199
Angora Rams, Imported	97	77
Angora Rams, Colonial	1,453	1,318

LIVE STOCK.—*(Continued).*

Description.	1908	1907
Angora Goats	16,799	86,041
Kafir Goats	50,078	44,375
Boars, Imported	66	52
Boars, Colonial	1,410	1,440
Sows	6,804	6,293
Other Pigs	17,397	17,137
Pigs available for slaughter	8,125	7,606
Fowls	329,908	257,703
Ducks and Geese	24,497	21,147
Turkeys	9,296	7,347
Guinea Fowls	20,561	16,267
Pigeons	15,422	11,032
Rabbits	3,413	2,735
Ostriches	961	876
Bee Hives	1,925	1,326

The presence of East Coast Fever in the Colony is easily traceable in some of the figures in this table. A decrease in the total number of cattle in the Colony is, of course, the first indication one would look for, but apart from this we find very substantial increases in the numbers of mules and donkeys, for transport purposes,—1,900 in the case of the former and 3,000 (or over 50 per cent. more) in the case of the latter;—whilst the number of horses has also increased. Further, we have noteworthy increases in the numbers of sheep, there being 661,466 in 1907 and 765,377 in 1908—still further indication of the connection between sheep farming and cattle farming to which I referred in my last year's article. The following statement will be found interesting in this regard, showing the total numbers of cattle and sheep (in possession of Europeans) in 1906, 1907 and 1908, respectively:—

EAST COAST FEVER AND SHEEP FARMING.

Table showing Numbers of Cattle and Sheep in Possession of Europeans in Natal in each of the four years 1905-1908 with the respective yearly decreases and increases per cent.

Year.	Cattle (No.).	Decrease per cent.	Sheep (No.).	Increase per cent.
1905	273,376	—	587,151	—
1906	243,857	10·8	600,055	2·2
1907	227,748	6·7	661,466	10·3
1908	220,413	3·3	765,377	15·8

From this table it will be seen that, as a disease reduces the number of cattle each year and cattle farming comes to be regarded, temporarily,

as unprofitable, interest in sheep farming tends to increase. The increase in interest in sheep farming has not, however, in the present case, taken place in the proportion indicated by the percentages in the column to the extreme right of the table, any more than the percentages to the left of the thick line indicate the actual losses of cattle from disease: in each case, natural increases in numbers have to be taken into consideration as affecting the percentages of increase and decrease. At the same time, the table shows the renewed attention which is being given to sheep farming as a result of East Coast Fever

V.—ANIMAL PRODUCTION.

The next table shows the nature and quantity or value of animal products turned out by farmers during 1908 and 1907 respectively:—

ANIMAL PRODUCTS.

Nature and Quantity or Value of Animal Products turned out by Farmers during the years 1906-7 and 1907-8 respectively.

Description.	1907-8	1906-7
Bacon and Hams, lbs.	345,434	322,866
Hides Horns, and Hoofs, £	4,379	3,124
Lard, lbs.	56,289	47,616
Meat other than Pork, lbs.	130,636	124,105
Pork, lbs.	135,485	152,628
Butter made on Farms, lbs.	366,527	369,842
Cheese, lbs.	15,477	14,868
Milk sold other than to Creameries, galls.	177,333	169,247
Eggs, dozens	472,010	426,430
Honey, lbs.	13,550	8,103
Ostrich Feathers, £	769	867
Mohair, lbs.	219,825	207,628
Wool, lbs.	2,160,905	1,979,999

Last year we noted a considerable increase in the quantity of hides, horns and hoofs sold by farmers as compared with the previous year; and, as will be noticed in the foregoing statement, there is another noteworthy increase, in respect to 1908 over 1907. The figures for the three years are: 1905-6, £1,977 value; 1906-7, £3,124; 1907-8, £4,379. There is also a further increase in the number of eggs sold by our farmers; and I would draw attention, too, to the gratifying increase in the quantity of honey produced. In 1906 the production was 7,244, so that it has increased by over 87 per cent. in two years.

Further remarks regarding animal products I will postpone for the next section of this article, dealing with the trade of the Colony in 1908.

(To be continued.)

Breeding of Horses for Remount and Saddle Purposes.

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(A Paper read at the Fifth Annual Conference of the Inter-Colonial Agricultural Union.)

When your Secretary a short time ago asked me to read you a short paper on any subject I might choose I hesitated for several reasons, as not only was it difficult for me to see how I was to find the time to write a paper of sufficient interest to lay before you, but—a greater difficulty still—I was unable to think of a subject which would promise to be of use as well as of interest. It was not until I noticed on the agenda an item dealing with the question of breeding from cast military mares and an appreciation of the far-sighted and helpful action of General Lord Methuen that it occurred to me that I might possibly make my subject apropos of this matter and help this very useful scheme forward in a small way by dealing, in not too technical a manner, with some of the points which concern the horse-breeder generally, and especially the breeder of that class of horse known as the military remount.

It seemed to me that not only would the subject be one fresh in your minds, but the time also was an appropriate one for dealing with a subject which might become one of importance to you both from a consideration of our own South African needs and, from the broader point, of the possible future needs of our wide Empire.

Matters of South African Defence are—with many other weighty considerations of State—about to be cast into the melting pot of reconstruction to emerge on ampler and more adequate lines than those to which we have been accustomed as citizens of different—and often differing—communities in the past.

Whatever the issue of the deliberations of those responsible for forming our defence system there is no doubt that the outcome must be an increased expansion of our existing machinery for defence, which, as a necessary sequence, must mean the increase of demand for a suitable class of horse for South African Military Service. This, however, is a limited horizon compared to the needs of the Empire in the same respect, and the obligations of South Africa as a country to which the Empire may look increasingly for the supply of remounts has been increased by the recent unification of its component States.

There is therefore an unlimited market for the South African Remount provided the right class of animal can be brought to that market, and the demand is one which will increase rather than decrease with time and may be looked to to amply repay the breeder at all times. In peace the deficiencies caused by disease and casting from age or wear must afford a steady demand, while the calls of war may at any time cause the demand to greatly exceed the supply. We all know the wastage of horse-flesh in war. War falls more heavily upon the horse than upon the soldier by reason of the privations and exactions of active service. A horse on active service is not easily exempted from duty, and it is too often the case that—with General de Brack—we have to say: "a wounded horse that can still serve must still serve," and he gives the example—quoted in Smith's Hygiene—of the horse which during the cavalry fight of Saalfield—in spite of its back being stripped of skin—carried the man who slew the Prince of Prussia. In action itself the horse always fares worse than his rider. In the charge of Balaclava 100 horses fell to 60 men, at Waterloo the British cavalry lost 100 horses to every 50 men, while our artillery in that same famous fight lost as many as 100 horses to every six artillerymen.

Such a fact may have inspired Lady Butler's fine picture of "Patient Heroes," the depiction of artillery horses under fire so familiar to every horse-lover.

The losses in action, however, are small compared to the dreadful waste of horse-flesh on lines of communication, marches, starvation and exposure.

During the Russian campaign Napoleon lost from 20,000 to 25,000 horses per month. Coming to times within our own memory and experience we all know the enormous wastage of horse-flesh during the South African campaign, and from the experience gained at that and other times we know that future wars will—if of any magnitude at all—entail upon our Remount Department the necessity of completely re-horsing all our mounted regiments six months after they have taken the field.

The demands of active service, however, with its uncertain and fluctuating requirements, do not afford the breeder the steady and certain market upon which he must depend if he is to seriously lay himself out for the production of a class of horse suitable for military use. The demands of peace time, however, give this assurance. Colonel Gornet, of the Remount Department of the War Office—speaking recently at the Royal United Service Institution—stated that as many as 173,000 horses were wanted to bring our units up to a war footing, and that to mobilise fully we need 53,000 additional horses for the Regular Army and 120,000 for the recently formed Territorial Force, while Sir Charles Dilke stated that while we had on our present peace footing 11,368

trained cavalry men at Home we had only 7,577 horses of all ages. Even within the last month we have seen the great difficulty of mobilising one division of regular troops in the Aldershot district. The press informs us that "every available horse in the Aldershot Command with all those brought down by the Territorials and several train loads of omnibus horses from London have been pressed into the service to turn out this one incomplete division."

The above facts and figures all tend to point the certainty of the market for the South African remount if the stock-raiser will take the trouble to cater for that market, and not, according to our time-honoured national custom expect the buyer to adapt his requirements to the particular pattern of the goods we have to offer.

A Question Answered.

To the question as to whether South Africa can produce a class of horse suitable to the requirements of the military service of our Empire in any part of the world and capable of holding its own against the Argentine, Austrian, or even the Australian remount, there is no hesitation in replying "Yes." On the one all-important point of stamina—of that endurance under trying circumstances which is so essential a point in a campaigner—there is no doubt the South African remount can hold its own with the best, and even excel the majority. This has been frequently demonstrated. In 1857, at the time of the Mutiny, we sent to India 5,482 horses bred in South Africa. These horses had been produced from the Cape or Native bred mares mated chiefly with the English thoroughbred sires introduced into the country in numbers during the Governorship of Lord Somerset and subsequently. The South African remount sent to India, though not a beauty, won—after much initial prejudice against his appearance—an excellent reputation based upon the principle embodied in the old adage "handsome is as handsome does." The first complaints against their undersized appearance rapidly gave way to the opinion that for staying power and general "good doing," under all the trying circumstances of a very trying campaign, the Cape remount was unsurpassed, and this good character he maintained later amid opposite climate conditions during the rigours of the campaign in the Crimea, where Cape horses were taken by several of the cavalry regiments ordered from India to the seat of war.

Years ago an officer writing to the *Country Gentlemen's Paper* about the Cape remount says: "There is no doubt the Cape horse stands the Indian climate much better than the Australian horse, being a hardier animal and continuing fit for work to a much more advanced age. The Cape horses imported during the Indian Mutiny are still spoken of by cavalry and artillery officers as the finest lot of horses ever imported for army purposes into India."

But to you, gentlemen, as South African stock-raisers there is no need to labour this point of the endurance and stamina of our South African horse, nor is it upon this ground that our position will be likely to be assailed when we compete with other horse markets in supplying the remount needs of the Empire.

QUESTION OF STAMINA.

The all-important question of stamina in the South African Remount may be considered as satisfactorily proved by the trials and experiences of the past in distant parts of the world, if indeed any further proof were necessary to augment our own knowledge of the staying powers of the average South African horse. There is, however, the reverse to the medal, and we shall see that stamina is not the only desirable characteristic in a horse which is to be suited for military purposes. Conformation, handiness, symmetry and size must be sought and certain defects must be guarded against, if we are to compete successfully with the other remount markets both in and outside our Empire.

Thirty years ago an officer of the Imperial Service who had been stationed at Kingwilliamstown, the headquarters of the Army during the campaign of 1878, states he had an opportunity of seeing some thousands of horses sent down for remount purposes between Queenstown and the Orange Free State, and he records his opinion that—as compared with the horses of 20 years before taken to India during the Mutiny "the breed of horses which are in this country is steadily degenerating year by year and unless the subject is taken up by the Colonial or Indian Government I think in a few years there will hardly be a good remount in the country." This was over thirty years ago.

Twenty years ago an official report was furnished to the War Office describing the South African remount as "Small and stunted in growth, deficient in bone, pinned in at the elbows, very badly coupled and ribbed up with bad drooping quarters, badly developed muscles of the croup and thighs, split up behind with crooked hind legs, the hocks being very far back," the only thing conceded in his favour was that he was possessed of a "good shoulders and forehand." In fact, the South African remount was officially "damned with faint praise" despite his previous records of meritorious service in sun and snow. That there was much truth in the foregoing official indictment cannot, it seems, be denied, for all the available records and literature of the day concur in stating that the Cape horse of some twenty-five years ago had deteriorated to a marked extent when compared with his forbears. The cause seems to have been chiefly attributed to the class of stallion introduced about that time for breeding purposes. Flashy, unsound, or weedy thoroughbreds, bought for a song at Tattersall's and imported at a high figure for the use of the South African breeder seems to have been the

chief cause of this period of degeneracy, which was further increased by the recognition of the part of the South African farmer of the fact that Merino sheep, Angora goat, or ostrich farming found a surer market and gave a better profit than the breeding of a class of horse which fetched but a poor price when placed upon the market. In addition to this factor, carelessness in the supply of, or deficiency of, food supply for the young stock and brood mares (which seemed to have been the rule rather than the exception) must have left its traces upon the horse of that time.

Such at any rate seems to me from a perusal of the literature of the day to have been the causes justifying the above unfortunate description of the South African remount. All writers concur in criticising first, the small size, and, secondly, the conformation of the hind quarters generally. Colonel Nunn, the late P.V.O. of South Africa, summed up the matter in the following words: "In fact the South African horse is, although small, good before but bad behind the saddle," and though this criticism was uttered some years since and matters have much improved, there is no doubt room still exists for much physical improvement, particularly in the direction indicated.

Let us briefly glance then first at the question of conformation, and particularly the points which lead to a remount being described as "bad behind the saddle."

As this is the region specially indicated and consistently criticised in the past I will confine my remarks to the parts "behind the saddle" for—as you will know—to attempt anything like a description of the points of the horse generally—or even an exhaustive description of the points "behind the saddle"—would occupy much more time than we have at our disposal just now without being of much use to us in considering the typical shortcomings of the South African remount.

Let us take then the most important of the defects of this region. As directly concerned in the weight carrying and propelling powers of the horse, I consider the conformation comprised under the terms "slack in the loins," "badly coupled" or "poorly ribbed up" to be the most important defect now under our consideration. This condition is due to several structural weaknesses combined, but it finds its expression apparently in the length and direction of the last or 18th rib and the dimensions of the bones of the spine in the region of the loin (or what is termed the length of the lumber vertrebrae and their transverse processes). If this last rib tends to lie flat instead of springing boldy outwards and backwards from the spine, the condition of bad "ribbing up" exists, and where in addition—as is generally found—the backbone tends to undue length in the region of the loin—and particularly where these transverse processes are short—there the condition of "bad coupling" and "slackness of the loin" is found.

The outline of the horse shown in the diagram is that of a well-coupled closely "ribbed up" animal such as would afford space for the tips of three or four fingers only between the last rib and the point of the hip.

Compare this diagram with the next showing the hind quarters in skeleton of a horse of the same height. If we take this diagram and place it over the first one we shall have a horse good in front but possessing just the fault so frequently attributed to the South African horse. I have intentionally exaggerated slightly the faulty points for the sake of emphasis, but the outline—even as it stands—must be familiar to all of us, for we meet horses of this stamp every day. Observe the weak back with that little depression between the loins and the croup so frequently seen in the weak-backed horse. This hollow is generally ascribed to too early breaking-in and over-weighting a horse. These may be contributing causes, but you will find this conformation in probably 15 or 20 per cent. of our horses before they have ever known a saddle. The short sloping quarter with goose rump, and the low set tail differ greatly from the lines possessed by our model remount. Passing the eye down the sloping haunch, notice how a vertical line would fall if starting from the point of the buttock or say the root of the tail. We see such a line passes almost entirely in front of the lower leg and reaches the ground through the hoof. Draw a line similarly in our model and we shall see that the line passes entirely behind the whole length of leg (both horses are depicted in a normal standing attitude).

Such a position constitutes one of the faults enumerated above in the official report when it describes the South African remount as having his hind legs and hocks placed "very far back." It is not a pleasing conformation neither is it a strong one, tending as it does to place the horse's centre of gravity far back, but I do not think the charge is so serious as that brought against the bent or "sickle hock." This conformation (or malformation) is essentially bad, being both weak and unsightly. You will notice in our model that I have drawn a dotted line down the two long bones forming this hock joint, and if you measure the angle these lines make as they meet you will find they enclose an angle of about 45 degrees. Similar lines drawn through the long bones of the horse upon the other diagram embrace an angle some 10 or 15 degrees less—which may not seem very much, but it counts for a great deal when the question of strength is considered, besides greatly altering for the worse the general appearance and symmetry of the horse. We can expect neither endurance nor speed from a hock-conformation of this nature, and both these latter points are essential in the remount. Amongst horsemen recently arrived in South Africa and making the acquaintance of the South African horse for the first time it is always a matter of remark and surprise that horses with hocks (in which exist all

the weaknesses to which horses' hocks are liable) seem to keep sound under conditions of work which, in Europe, would inevitably produce spavin, curb, thoroughpin, etc., and other unsound conditions.

The reason for this immunity is, I think, to be found in the early surroundings of our young horses, the greater liberty of movement, and the more hilly and broken nature of the ground upon which a livelihood has to be picked up. These factors all tend to a strengthening and developing of the joints to which the European colt is often a stranger.

The fact, however, that the hocks of our horses seldom give way is no argument against the improvement of a conformation which is unsightly and incapable of furnishing the speed so necessary to the military horse (which must be capable of rapid movement over long distances), and we may lay it down almost as an axiom, I think, that the straighter the hock the better the speed. All our great gallopers have possessed this so-called "straight dropped" hind leg. Broad gaskins and straight hocks are points which the breeder of remounts would do well to especially carry in his mind as desirable features. If these are secured the other desirable points must almost of necessity follow. A good hock such as we have been considering may sometimes be found with a sloping quarter and low set tail, but as a rule if the hock is good and well "let down"—as the saying is—the conformation of the quarter and loins will be good too.

Now let us glance briefly at the rear aspect of our remount. The sickle hock or the hock "too far back" will generally constitute or exist together with the condition known as "cow hocked," *i.e.*, a tendency for the hocks to approach each other instead of being well separated and allowing the lower leg to drop vertically as in the diagram. You will notice the incidence of the lines in the two hind quarter representations. In one case lines running through the centre of the lower leg remain parallel, or almost so, while in the other case the lower leg-bones are so far out of the vertical that similar lines drawn through their centre converge about the croup.

This conformation of hock is so common that if you will notice the next twenty-five horses you see I do not think you will find one of them which will pass the critical test of the plummet line, all degrees of variation from the vertical being noticed, from the nearly upright to the extreme of the two hocks almost touching each other at the standing posture. The absolutely vertical hock will be so rarely met that it may seem that I am giving a counsel of perfection when I set it up as a pattern, but there is no doubt that the more nearly we can approach to the vertical line described above the sounder and more speedy a conformation we shall attain to, while as regards the look or appearance of the straight *versus* the "cow hock" I hardly think there will be a difference of opinion on such a point. The low set tail will, of course, obtrude

itself more on the notice from the hind view, and from here we shall be able to judge of the presence or absence of that condition "split up behind" which is shown by drawing aside the tail—a condition recorded by more than one of the critics of the South African horse in the past.

We have thus briefly reviewed the main faults which go to make a horse "bad behind the saddle," and it is not necessary for me to point out the manner in which such fault may be avoided. The old aphorism that "like breeds like" holds as good of the hindquarters of the horse as of anything else in Nature. Remembering this we see that we must secure in sire, and as far as we possibly can in dam too—that conformation which will tend to counteract or eliminate these particular points or weaknesses which have subjected our horses to criticism in the past.

The type of horse brought forward as an illustration in profile has been intentionally depicted as compact and heavy-boned. If you take the trouble to measure him you will find his height at the withers about equals his length from breast to buttock which as you will know is not a conformation made for great speed. I have thought it better to emphasise the form of the compact handy horse rather than err possibly on the side of the long light-boned offspring of the weedy thoroughbred which is responsible for many of the unfortunate points of the South African horse of to-day. The horse depicted will make an excellent mounted-infantry horse, handy and—from his light fore-hand and straight-dropped hock—reasonably speedy. His height will be about 15 hands, and the shank bone measured below the knee will be at least 7 inches, while he should girth well at, or about, 70 inches. If we aim more ambitiously at producing a horse suitable for a cavalry remount we must increase our height by, say, a couple of inches. Notice the effect of increasing this horse's height by $\frac{3}{4}$ of an inch upon the diagram, an equivalent of 1/33 of his present height. (Although in our diagram we have converted our mounted infantry horse into a cavalry horse by simply adding to the length of his cannon or shank bone, the breeder will guard against a principle which increases total height by increasing only leg measurement.) Still as he now stands he makes a passable cavalry remount of about 15·2½ hands, a trifle long in the leg but not weedy or long in the back, possessing a fair girth and good back ribs, a horse which would carry a light weight cavalryman and go all day with ease.

The horse fit for a gun team either of horse or field artillery will need more bone and substance, particularly for horses intended as wheelers. Breeders will have their own opinions as to the best method of securing the desirable amount of bone and substance, and the question of the thoroughbred *versus* the hackney sire has been so well ventilated in the past that it is not my intention to step upon this debatable ground, except that I see no reason why the necessary bone and substance for the heavier class of artillery remount should not be obtained from the

big-boned compact thoroughbred sire, while for the lighter class of cavalry and mounted infantry horse I believe the thoroughbred sire will not be equalled, provided the mares are chosen carefully in the endeavour to produce progeny as near to the requisite type as possible. Misfits will, of course, always occur, but the requirements of our larger towns and industrial centres will readily find a place for them even if the remount officer does not purchase them for service in the humbler capacity of pack horses, etc., on lines of communication, etc.

There is one point, however, gentlement, in conclusion, which I must deal with in consideration of the conformation of the South African remount. Again and again in the past history of the South African horse one meets the criticism of light bone, "stunted undersized" horses. This condition of affairs resulted, I believe, from several causes: first, the indifference as to the choice of the mare—any mare that was no good for anything else being thought good enough to carry a foal; second, to the undesirable character of the sire, who was either a nondescript local equine product or perhaps a flashy thoroughbred of a weedy type originally hardly good enough to castrate and keep as a general service horse. But perhaps the factor which contributed most of all to the low estate of the South African horse was the treatment meted out to him in his youth under a mistaken system of economy or an erroneous idea that the free life of the veld with the meagre livelihood it afforded would tend to develop the necessary traits of hardihood and endurance. If a sufficiency of food, of properly balanced constituents, could be ensured under natural conditions all the year round the argument for a natural life would have greater weight, but such—in these days of enclosed farms and increased tillage—is rarely the case, and—if we would avoid small size of bone and inevitable stunting in all proportions of our youngsters they must be kept growing steadily without check on an abundance of nutritious food, avoiding the distention of bulky in-nutritious feeding which tends to destroy the symmetry of the growing colt. Such treatment implies at least one good feed a day and shelter during nights and in cold weather. We need then have no fear that we shall produce a weedy youngster. Unlimited freedom under natural conditions with adequate feeding will eliminate the "weed" if we have been but moderately careful in our selection of sire and dam, and we shall always bear in mind the common saying that "a good big horse is better than a good little one." At any rate the South African remount breeder will find the price of the one more satisfactory than that of the other. Handiness, hardiness and speed can, by selection and care, be bred as well into 15 hands as into 14 hands height, and there is no reason whatever to think that the increased development to be secured by careful mating and early feeding will do otherwise than increase the existing good points of the South African remount and eliminate the bad.

From the item on the agenda, and from a copy of a circular your Secretary was good enough to forward me, I see that a definite effort is to be made to stimulate the breeding of horses suitable for remount purposes by the use of cast military mares. This appears to me an excellent scheme and one likely to afford an opportunity of obtaining as brood mares animals possessing the requisite size and substance. It goes without saying that the mares chosen for this experiment will—although cast—be free from hereditary defects. This very important point may safely be entrusted to the care of your Veterinary Advisers, after which point the outcome of this far-reaching and interesting experiment will rest with the breeder himself.

The terms of transfer seem to me reasonable, as does also the suggestion that the progeny secured shall in due course be offered first to the Imperial remount authorities before being otherwise disposed of. These conditions are not so hard as those, while I quote, by which Henry the VIII. of England sought to stimulate the breeding of war horses within his realm by enacting that "Archbishops and all Dukes shall keep seven entire trotting horses for the saddle, each of which is to be at least 14 hands high. Every clergyman possessing a living of £100 per annum, or anyone whose wife shall wear a bonnet of velvet is to keep one trotting entire horse under penalty of £200."

I fear nowadays we cannot fill the mounted ranks of our world-wide defence force by resorting to that "velvet bonnet" clause, and the arrangements now made between the War Office and your Union seem to me the next best action to take. The movement is an excellent one, and I think starts a new era in the history of the South African remount. I feel confident that we can, if working on right lines, not only remove the reproaches of the past but can aspire to make the South African remount a model for the rest of our Empire horse-breeders to copy. I congratulate you, gentlemen, on the effort towards this end which you are now initiating.

Don't be afraid of work; you are always paid well for it at the finish.

It is time well spent to handle young colts as much as possible, always in a very gentle manner. It is a great mistake to treat colts harshly or to frighten them. Watch the help, especially the boys, who sometimes takes a vicious delight in frightening colts to see them jump.

The Seasoning and Characters of Natal Native Timbers.

By C. W. Chilvers, Crown Forester, Ingeli.

It is so often said by woodworkers and others that our indigenous timbers are of little use owing to their tendency to warp and shrink, that a few remarks on the methods used by sawyers in this country may be interesting.

In the first place, the sawyer obtains a license for a tree at any time of the year; it is felled about 2 to 3 feet from the ground and the required length cut off. The "butt" end is shaped into a rough cone to facilitate "slipping," a 2-inch hole bored through and a chain inserted, to which the span of oxen is attached, and it is then "slipped" to the pit. Here the "kop" or rough cone is cut off, the log "lined up" and levered or rolled on to the transoms placed across the pit, set plumb and wedged up firmly. According to the diameter of the log (if yellowwood), two or three cuts are made from end to end about twelve and a half inches apart. After this preliminary "breaking down" is completed, the twelve inch "flitches" are "lined up" at right angles to make boards, 1 x 12, and planks, 3 x 12, or 4 x 12, these latter being afterwards converted into scantlings, 3 x 4, and purlins, 3 x 2.

The pieces of timber are stacked on top of each other, with no strips between to allow air to pass through, consequently they have no chance of drying properly, and in most cases of summer-worked timber soon become covered with a white fungus or mildew. The timber sometimes remains for weeks inside the forest, but is more often "slipped" outside and stacked in the same close manner as before, *but exposed to sun and wind,* with perhaps a slab on top to prevent the top pieces "warping." Little care seems to be taken to see that the stack is set true and "out of wind."

Now, most authorities are agreed that it is best to fell trees when the sap is down (April to July being the best months in Natal), but proper seasoning is of more importance than the time of felling.

The "crown" is better left on till the foliage has wilted, as the leaves remove a considerable amount of sap. The log should be removed from the forest about a fortnight after felling, *but not left out in the sun and wind.* Barking greatly assists the drying process, reduces the weight, and renders some kinds less liable to be attacked by boring insects (c.f. Fourcade, pp. 61, 162), *e.g.,* Ironwoods, Essenwood, Dog Plum and Cape Beech. To avoid undue splitting the log should be cut through the

heart as soon as possible after removal. Some kinds, such as Essenwood, Dog Plum and Cape Beech should be converted into lumber soon after, and it is generally believed to be best to immerse them in water for a fortnight; others, as Sneezewood and Black Stinkwood, may remain for months before being further cut up, but in this case the time required for seasoning is prolonged.

Natural seasoning may take from three to ten years, according to species and size, but may be accelerated by soaking the logs in water, by steaming, or by placing in hot air kilns. "During the process of seasoning, timber loses one-fifth to one-seventh of its weight and shrinks considerably, a plank of Oak or Yellowwood may shrink one-twelfth in width, and one of Pine or Stinkwood one-fortieth." (Fourcade, p. 162.) Yellowwood also shrinks appreciably in length.

Sawn timber should be stacked in a dry place, not exposed to strong sunshine or winds, but air must be allowed free circulation all round each piece; this is best attained by placing strips of wood, half-inch by three-quarters, at intervals of about three feet between each piece, the bottom one being well supported on joists carefully set true and "out of wind." Stacks should be turned over occasionally, especially at first.

Yellowwood being far superior to Pine for flooring could well be cut up into seven inch "flitches," and stacked for a year before being converted. This timber is easily worked and has a handsome appearance when oiled or polished, it takes glue and stains well, and in general is suitable for most kinds of joinery. Being a fissile wood it is best to bore holes for nails at ends, and taper grooves and tongues are preferable. It is possible to obtain lengths of 70 (seventy) feet and over (I have seen poles close on 80 feet at Impetyne Forest, and some 4 feet in diameter, and, as far as it is possible to judge, quite sound).

I know of a Yellowwood floor—of six inch boards—laid down, I am given to understand, over sixteen years ago, the joints of which are still quite tight; this is more than can usually be said of a Pine one; also of a ceiling of twelve inch boards put up about three or four years ago; the joints of this are as tight as when first made. In the old portion of the Ingeli Forest lodge there is a batten door of Yellowwood made about four years ago, the total joints of which are now—our driest time of year—open ¼ inch. This door has never been painted and is about five feet from the kitchen stove with a corrugated iron roof just above it. I understand the boards from which it was made were seasoned in water. For comparison, there is a batten door of Pine, unpainted, erected two years ago in the new building: the total joints of this are open ⅝ inch, or *two and a half times as much as the other,* and this door is in a much more favourable position, being protected from the roof by ceiling and not so exposed to draughts. The floor of the new building is of Yellowwood not grooved and tongued: this timber was far from seasoned when used,

but the joints will compare favourably with many Pine floors I have seen.

The climate of Natal, with its dry, windy winters and wet summers, is particularly trying to timber of all kinds, even Mahogany and Boxwood being affected. There is therefore all the more necessity for careful seasoning.

We have many other valuable timbers in our forests, and a little experimental work is needed to demonstrate what can be done with them. Experiments should be tried to determine what are the best methods of seasoning the various kinds, and the sizes to which they will cut, so that the time required may be shortened without their being liable to warp and get crooked during the process.

Waterwood, Lemonwood, Wild Peach, Wild Chestnut, Camdeboo Stinkwood, Knobwood, the Essenwoods, Bitterbark, Cape Beech, Bush Willow and others are all worth trying. I know from personal experience that Lemonwood is a useful timber, having used it quite green for making window sashes, and found there was no appreciable shrinkage: also when dry it made most excellent T squares, superior to some made at the same time from dry Black Stinkwood. It is easy to work, has a pleasing appearance, especially when showing the "silver grain," and it takes nails well. This tree would cut up into scantlings for framework or sleepers. The Essenwoods should be valuable woods for cabinet work; they are light, easily worked, and possess fine figures, well brought out by polishing. They require very careful seasoning and are not suitable for outside work. Bitterbark or Quar is an exceedingly hard wood: it might take the place of Lignum Vitae for bearings of high speed shafting, mangle rollers, heads of braces and other tools, skittle balls, etc. Bush Willow is rough and has a somewhat similar grain to Flat Crown, so well known for naves of wheels.

Of Black Stinkwood, Black Ironwood and Sneezewood there is little need to write, for most people recognise that they have some value, though the latter, which ranks equally with the most valuable timbers the world produces for marine and such like purposes, is only considered fit for fence posts. The checking of Black Ironwood was found at Qudeni to be considerably reduced by placing the sawn timber in a steam box connected with the engine exhaust for a few days. Black Stinkwood might be tried for tobacco pipes, but as these are mostly made from roots it is to them we should look if the manufacture is seriously contemplated.

Sow your seeds and look after them; they will do the rest.

Inter-Colonial Agricultural Union.

FIFTH ANNUAL CONFERENCE.

(*Continued from page 354.*)

THE following discussion took place on Mr. Alexander's motion *re* East Coast Fever:—

Mr. Hull (Rhodesia) referred to the success which had attended their efforts to stamp out the disease in Rhodesia, and said that the disease was no more hopeless—in fact, it was less hopeless—than lungsickness or rinderpest. In Rhodesia they had freed their herds of the disease, without the aid of any paternal Government. Individual effort was necessary. (Hear, hear.) The fault had been that the regulations had been subjected to a vast amount of clipping, which to a certain extent nullified the good effect of those regulations. It was absolutely useless to say that the disease was hopeless. In Rhodesia they drew up a series of regulations, by which they made every farmer in the country a policeman or a detective. In the clean areas, before a man could move cattle, he had to get the written consent of every other farmer in the district. This might seem cumbersome, but the farmer was in a better position than anyone to say whether or not a permit should be granted. Money alone would not get rid of the disease; the regulations must be enforced. (Hear, hear.)

Mr. Mitchell (Natal) said they had been hampered in Natal by two things: one was lack of funds, and the other was fear of the Native. Mr. Gray, the Chief Veterinary Surgeon of the Transvaal, had told them that their one sheet anchor was universal branding, but this was never enforced because the Native Affairs Department would not agree to it.

The Hon. W. A. Deane (Minister of Agriculture) said he hoped that members, especially Natal members, would keep strictly to fact. He emphatically contradicted Mr. Mitchell's statement with regard to the meting out of different treatment in the case of whites and blacks. Outlining the policy of the Natal Government in regard to the suppression of East Coast Fever, Mr. Deane said that Government wanted to secure co-operation between the farmers and the Government, and for this purpose a large meeting of representative farmers was called. Their suggestion that the movement of cattle should be controlled by the farmers themselves was adopted by the Government. The system had, however, proved ineffectual, and the Government had been obliged to reassume direct control of the movement of cattle. Fencing had been gone in for, and £18,000 had been spent for the purpose during the last

eighteen months, whilst £30,000 was due to be spent in the near future. They also had adopted the policy of stamping out, the method of which was to remove cattle for slaughter from infected areas, and pay compensation therefor. They could do nothing more, owing to want of money. There were still several divisions free from disease, and these districts had been kept clean by the stamping out method. With the experience they had had, they had come to the conclusion twelve months ago that stamping-out must be effected. Diseased and in-contact cattle must be slaughtered and the district fenced. The other Colonies had been approached to make a contribution sufficient to provide for the complete stamping out of East Coast Fever in Natal. A board was to be appointed, consisting of representatives of the contributing Administrations. Unfortunately, this suggestion had not been adopted by the Colonies approached, each Government in turn refusing to help.

In Natal the largest cattle owner was the Native, and these Natives were all over the Colony. The Native's co-operation was sought. He (the speaker) toured the Colony, and large gatherings of Natives were organised to whom he explained the disease and the methods proposed for its suppression. The Government, however, met with opposition from the Natives everywhere. Illicit movement of cattle was largely the cause of the spread of the disease, and the Native was the chief offender, and this in spite of all restrictions. He instanced the case of the outbreak of the disease in Alfred County, which had spread over a considerable area in a very short space of time and had jumped the natural barrier offered by the Umzimkulu. He would not be at all surprised to hear that the disease was already smouldering in East Griqualand. The only chance the Cape had was to establish a broad zone along their border, guarded by Europeans. Even now South Africa should grapple with this disease. If it spread as it had done in Natal, it was going to envelop the Cape Colony and Orange River Colony. The farmers of these Colonies would do well to persuade their Governments to make a substantial contribution to help Natal.

Mr. F. B. Smith (Director of Agriculture, Transvaal), said that the experience of Rhodesia had been repeated in the Transvaal, and that it was a matter of method more than of money. They had got rid of the disease by stopping all movements of cattle, and by the fencing of infected areas; it had been proved conclusively enough that a fence would check the course of the disease. They had also done their best to brand all cattle in infected areas. They had a large staff of veterinary surgeons, and these men they regarded as their first line of defence. If they had joint action, let it be action for the whole of South Africa and not for the eradication of the disease in Natal only. There was Swaziland also, which was an infected area.

Mr. P. J. du Toit (Under Secretary for Agriculture, Cape), de-

tailed the steps taken there to keep out the disease. He blamed the Natal Government for not answering their correspondence, and said that Natal should tell the Cape what it was prepared to do in the matter. If Natal was not prepared to do anything, let them say so. Natal should tell them at the Cape whether the latter Colony could come in to stamp out the disease, and they would stamp it out. He felt sure that the Cape was prepared to do a great deal if Natal would only give it the word.

Mr. W. J. Palmer (Director of Agriculture, Orange River Colony) said that the conditions in the Orange River Colony were such that there was no very great danger of the disease crossing the border of that Colony. They had, further, not yet been able to discover the brown tick in the Orange River Colony, which was the chief variety of tick carrying the East Coast Fever germ. Every farmer in his Colony deeply sympathised with the unfortunate farmers of Natal who had suffered from the ravages of the disease. When the disease broke out in the Transvaal they made a regulation to the effect that any cattle straying across the border would be shot, and this had been carried into effect. With regard to Natal a border fence had been erected, and this was properly guarded; whilst another fence was also erected, parallel to this. As far as the O.R.C. was concerned, no weak-kneedness was going to be shown with regard to the disease. If the disease did enter the O.R.C., stamping-out would probably be adopted. He considered it was a matter for all the various Governments to take joint action upon, upon the advice of their veterinary experts. (Hear, hear.) He would deprecate the alarmist statements which had been made to the effect that the disease was bound to sweep through the whole sub-continent. If they sat with folded arms, certainly this would happen, but they must put their energies into fighting the disease, and the spread of that plague certainly could be overcome by joint effort. (Applause.)

Mr. Connacher (Mozambique) said that his Government was willing to co-operate with them in the eradication of the disease. He considered that the Government of German East Africa ought to be asked to co-operate, as that Colony had East Coast Fever on their borders, and the disease would undoubtedly spread south after South Africa itself had cleared of the plague.

Replying, the mover (Mr. Alexander) said it was time that some joint action was taken by the South African Governments; it had been urged upon them in 1904 at the Pretoria Conference, it had been urged upon them since, and it must be urged upon them again now: if united action was not taken by the South African Governments at once, it would later on cost them ten times as much to stamp out the disease as it would now.

The resolution was carried unanimously, and, upon the motion of

Mr. Alexander, the central board suggested was constituted. The delegates elected were as follows:—Messrs. Lee (Cape), Kolbe (O.R.C.), Evans (Natal), Hull (Rhodesia), Connacher (Portuguese East Africa), and Robertson (Transvaal).

Resolutions pointing out the necessity for legislation to provide for the eradication of noxious weeds, for united action on the part of all the S.A. Governments for dealing with tuberculosis, for the prohibition of all speculation of cattle in districts where East Coast Fever prevails, for stringent measures for the eradication of scab, and for united action to prevent the spread of the disease known as "trypanosomiasis," were passed with little discussion. In connection with the last-mentioned resolution, Mr. Watkins-Pitchford (Natal Government Bacteriologist) said that he had already pointed out the danger to the Natal Minister of Agriculture, who had responded by granting him assistance for the purpose of investigation of the disease. Resolutions were also brought forward and carried by the Conference representing to the S.A. Governments the great advantages to be gained by a systematic destruction of ticks, recommending the adoption all over South Africa of a uniform system of branding, and pointing out the need for uniformity in the regulations governing the sale of dairy produce throughout South Africa.

PLANT DISEASES.

Mr. Barrett (Portuguese East Africa) moved:—

"That, in the opinion of this Conference, it is urgently necessary that vigorous measures should be adopted in order to prevent the spreading of plant diseases in South Africa."

By request of the Conference, Mr. Lounsbury (Cape Government Entomologist) addressed the delegates. He said he was against the resolution, as he thought that it might be taken to support the policy of a certain one of the South African Colonies which had adopted methods of protection against plant diseases which were likely to prove detrimental to the interests of the fruit and other industries of other Colonies, those means being, in his opinion, ineffectual for the purposes for which they had been adopted. Mr. Lounsbury then proceeded to describe the rapidity with which fungoid diseases spread through a country, instancing vine anthracnose and phylloxera in Europe, asparagus rust in America, and apple fusicladium in Australia and elsewhere, etc. From his experience, he thought it better that plant diseases should be left to take their own course rather than that Government measures should be adopted which would have the effect of stifling the commerce of the country. It would be different if measures could be formulated that would successfully check the spread of those diseases, but this he said was absolutely impossible, and they would be playing with a double-edged sword in adopting any such measures. He referred also to the

liability of these fruit troubles to develop in transit. Fruit might appear absolutely clean when they were railed, but before they reached their destination disease appeared. In conclusion, he said the passing of the motion before them might easily lead to the imposition of restrictions that would stifle all commerce, not only as regards fruit, but as regards potatoes, oathay, lucerne, and so on.

Mr. C. G. Lee (Cape Colony) considered that the diseases which should be dealt with should be specified, and he accordingly moved the addition of a rider to the effect that the Government experts of the various Colonies decide as to the diseases to be dealt with. As the resolution stood at present, there was a certain amount of vagueness about it.

The addition of this rider was agreed to.

Mr. Pole Evans (Transvaal Government Mycologist) said he had listened with interest, not unmixed with feelings of regret, to the remarks of his colleague, Mr. Lounsbury, on the subject of plant diseases generally, and, while anxious to avoid anything like a controversy, he felt it his duty, in justice to the Colony he represented, and whose policy had been attacked, to draw the attention of the members to the fact that the opinion expressed by Mr. Lounsbury could not be regarded as either accurate or up-to-date, neither were they in harmony with the latest views of science on the subject of plant pathology. Summed up briefly, Mr. Lounsbury's argument amounted to this: The spores of plant diseases were everywhere; they could be carried anyhow; therefore, any attempt to protect the interests of the farming community of the Colony by the exclusion of diseased fruit, vegetables, or plants coming from another State could only be regarded as an unfriendly act, calculated to shake the confidence of the farmers who raised these contaminated crops in the unwillingness of his neighbours to buy such crops, and raise crops of a similar character for themselves. At the same time, and almost in the same breath in which Mr. Lounsbury condemned the policy of the Transvaal, he asserted that the Cape Colony was doing its utmost to exclude pests from oversea. Surely, such an action was difficult to justify, and could hardly be regarded as consistent. If the germs of plant diseases were ubiquitous, and were carried, as Mr. Lounsbury said, by everything and everybody, what good purpose were Mr. Lounsbury's precautions regarding the introduction of oversea pests likely to serve? Was it not probable that the feelings of the oversea growers were likely to be hurt by the unfriendly behaviour of the Cape authorities, and their confidence shaken by the unwillingness of the Cape to receive contaminated fruit and plants from oversea, after the oversea growers had taken so much trouble to raise them? To be perfectly consistent, Mr. Lounsbury should see to it that the stand taken up by this Colony with regard to oversea plants and fruit was identical with the policy which he main-

tained should be adopted by the Transvaal, and which he had so directly attacked. Fortunately, however, the germs of plant diseases, generally speaking, were not universally distributed all over the world, neither were they conveyed over enormous distances by wind, as Mr. Lounsbury appeared to suppose; neither were they lurking everywhere, waiting for the advent of a season favourable for their development before springing into activity. As a matter of fact, many diseases of plants were no more readily spread than diseases of animals, if proper precautions were adopted to hold them in check, and it was, he maintained, the duty of every Agricultural Department to do its utmost to protect the interests of the farming community entrusted to its care by every means in its power, and to abandon no line of defence until it had proved altogether untenable. A policy of drift was on which was only excusable when no other policy was feasible, but its adoption, even then, was no argument in favour of its being taken up by those who found themselves in a more fortunate case, and so far as the Transvaal was concerned, such a policy would be altogether inexcusable. With these preliminary remarks, he would proceed to discuss in detail one or two points in connection with inspection work as carried on in the Transvaal. Mr. Lounsbury, in his address, conveyed the impression that the responsible duty of condemning consignments of imported plants and fruit was entrusted to laymen who were permitted to act upon their own responsibility. If this were so there would be good grounds for complaint, but as the precaution was taken of sending samples from all suspected consignments to Pretoria for examination and report before any action was taken with respect to their destruction or rejection, in this way he maintained that the interests of the consignor received due and reasonable consideration in every instance. That the adoption of such a course was very desirable, in justice to growers and for their own better protection, would be more apparent when he mentioned that for some months past the Cape Colony had been sending forward to the Transvaal large consignments of potatoes infected with Irish potato blight. Although this disease was one of the best known and most important fungus pest of this plant, the Cape authorities themselves failed to recognise it, and specimens of it were sent by them to Pretoria for identification, so that in this connection it was quite conceivable, if they had depended entirely upon the performance of plant inspection duty by laymen, the Transvaal would have been inundated by this disease before its precise character became known. If they accepted Mr. Lounsbury's theory regarding the distribution of the spores of plant diseases by the wind, it was quite conceivable that the average farmer would in all probability have attributed the subsequent inevitable destruction of his potato crop to the malign influence of the atmosphere, instead of to the circumstance that he had used seed contaminated by the mycelium of this parasite, to whose pre-

sence the occurrence of all outbreaks of this disease must be attributed. Further, he wished to point out, before closing his remarks on this subject, and in defence of the action taken by his Colony with regard to certain fungoid diseases not hitherto regarded as being of any great importance, that it was now generally recognised and accepted as an indisputable fact that, under favourable climatic conditions, certain organisms, ordinarily saphrophytic in character, might, and did, become actively pathogenic. For this reason, the greatest care must always be exercised in dealing with all diseased shipments of imported plants and fruits, as it was impossible to forecast the probable result of the introduction of such contaminated consignments into fresh fields, and they must therefore regard all such with suspicion, and take every precaution to exclude them till thoroughly satisfied as to their harmless character. (Hear, hear.)

Mr. F. B. Smith (Director of Agriculture of the Transvaal) said Mr. Lounsbury's attack upon the policy of the Transvaal with regard to plant diseases was a most unwarranted one. Surely they owned something to the farmers of the Transvaal? Surely their farmers should be protected against the negligence of the careless farmer? What they wanted to do was to bring the bad up to the level of the good, not level the good down to the bad. (Hear, hear.)

Mr. McDermott (Cape) moved as an amendment:—

"That this Conference, while fully favouring the policy of controlling plant diseases in South Africa by every possible means, urges that any imposition or restriction of commercial and industrial interests of the general community, shall have all reasonable consideration."

This amendment was carried.

RAILWAY MATTERS.

The Hon. W. F. Clayton, M.L.A. (Natal), moved a resolution, which was carried unanimously, to the effect that no changes be made by the various Railway Administrations in the tariffs upon S.A. produce pending the establishment of a general fixed policy as to Customs and railway rates by the Union Parliament, and that in any case the authorities be requested to obtain the opinion of the Agricultural Union before making any such changes.

Upon the motion of Mr. Kolbe (O.R.C.) it was decided to approach the various S.A. Railway Administrations with a view to obtaining reductions in the fares of show judges and live stock attendants proceeding to and from agricultural shows.

A resolution was also carried suggesting that stock or produce that have won first prizes at agricultural shows, under certain conditions, be carried free by rail to and from the central shows, in the event of such shows being established.

AGRICULTURAL SHOW MATTERS.

Mr. C. McG. Johnson (O.R.C.) moved:—

"That at agricultural shows in South Africa it is desired as far as possible to adopt uniform methods of management, including uniform badges, prize cards and a uniform arrangement for the payment of judges' expenses."

Mr. Kolbe (O.R.C.) seconded, and the resolution was carried.

Mr. C. McG. Johnson (O.R.C.) moved:—

"That the exhibitors of all horses entered in pure-bred classes at agricultural shows, should supply pedigrees, endorsing names of at least sire and dam on back of entry forms, which pedigrees must have been registered with some recognised stud book."

The resolution was carried.

ROADS AND BRIDGES.

Mr. Mitchell (Natal) moved:—

"That, in the opinion of this Union, and as an aid to the economic and premanent development of the agricultural industry, it is necessary that all South African Governments be urged to construct branch railways through suitable districts; and to construct good main roads and bridges, suitable for mechanical transport, between farms and railways."

Mr. Mitchell said that animal transport was coming to be a thing of the past, and mechanical road transport must be adopted to take the place of animals. Animals should be left on the farms to do the ordinary farm work, and all transport be done by mechanical means. For this purpose the roads must be hardened, and cheap but strong bridges constructed. Whenever new railway schemes were being discussed, it should be seriously considered whether the provision of mechanical road transport would not answer the purpose just as well.

Col. Leuchars (Natal) seconded the motion. He said that the mistake in the past had been that the roads of the country had not been properly graded. (Hear, hear.) In many districts, of course, railways or tramways were necessary, but he thought that in the past such railways had been too substantially constructed.

Mr. Pott (Transvaal) moved as an amendment that the words "to construct branch railways through suitable districts, and" be omitted.

The resolution was carried without amendment.

IMPERIAL AGRICULTURAL UNION.

Mr. A. G. Robertson (Transvaal) moved:—

"That the value of the work of this Union would be greatly increased by the adoption of the principle laid down in the President's circular letter, and that the Executive Committee be instructed to use its best efforts to bring about an amalgamation of Imperial agricultural interests, on the lines suggested in the circular referred to."

In moving, Mr. Robertson read the circular letter referred to in his resolution. This circular pointed out the advisability, in view of the impending political re-constitution of South Africa, of the South African Inter-Colonial Agricultural Union's approaching, at the earliest opportunity, other British Colonies with a view to the formation of a Union which would be representative of British Colonial agricultural interests throughout the Empire. Such a Union could then, together with a similarly constituted Union in the British Isles, join, as one body, the International Agricultural Union whose headquarters were in Rome. He suggested that Australia, New Zealand, British Africa, and Canada be approached in the first instance, and, later on, perhaps the West Indies and other Colonies.

Mr. C. G. Lee (Cape) seconded, and the resolution was carried unanimously.

POULTRY FARMING

Resolutions asking the Governments of South Africa to give every possible encouragement with a view to fostering the poultry industry and to institute an inter-Colonial egg-laying competition, were passed, upon the motion of Mr. A. Basden (Transvaal)

MARKET MATTERS.

The following resolutions on market questions were carried:—

(1) "That, in connection with all municipal markets, provision should be made for the consignment of agricultural produce direct to the Market Master, for sale, in accordance with instructions from the consignors, and also for the payment of the proceeds of such sales, less commission charges to the consignors."

(2) "That this Union instruct its Executive Committee to urge upon the various South African Governments, and upon all municipal authorities, the necessity for compelling all market agents to be licensed, and to provide satisfactory security for the due payment of proceeds of the sale of products, etc., forwarded to them by farmers for disposal"—with rider to the effect that the Executive Committee should take strong measures to enforce and carry out the resolution."

(3) "That this Conference considers that it is desirable that, upon all governing bodies controlling municipal markets, provision should be made for farmers to be directly represented."

AGRICULTURAL IMPLEMENTS.

Upon the motion of Mr. Hosking (Natal) the following resolution was carried:—

"That this Conference take steps to induce the manufacturers of agricultural implements to carefully study the requirements of the South African farmers, with a view to the manufacturing and sale of implements in this country."

FARM TELEPHONES.

A resolution urging the Union Government to make provision whereby a system of farm telephones shall be established as widely as possible, was carried, upon the motion of Mr. Baily (Transvaal).

S.A. NATIONAL UNION.

It was resolved, upon the motion of Mr. Van Alphen (Transvaal), that, seeing that the objects of the S.A. National Union are similar in their character to those of the Inter-Colonial Agricultural Union, earnest efforts should be made to secure mutual co-operation for the achievement of those objects.

CONSTITUTION OF THE UNION.

The report of the committee appointed to go into the matter of the amendment of the constitution of the Agricultural Union was read by the Secretary. The report showed that it had been decided by the committee to recommend the formation of a central committee to keep the objects of the Union before the different Governments of South Africa and the public generally. It was also thought that this committee should remain in existence until the next Conference of the Union, in which time they would consider any alterations in the constitution required, and report to the next Conference.

The report was adopted.

NATIVE LABOUR BUREAU.

Mr. Hull (Rhodesia) moved, and it was resolved:—

That, with a view to the development of agricultural industry, and to the scarcity of Native labour, it is desirable that steps be taken for the establishment of a Labour Bureau, from which labour could be drawn by farmers."

LAND SETTLEMENT.

Mr. Hosking (Natal) moved:—

"This Union is of opinion that closer settlement is essential to the true agricultural progress of South Africa, and therefore urges upon all South African Governments the desirability of purchasing or expropriating land, on reasonable terms, for the purpose of disposing of it to suitable settlers, by lease, or otherwise"

Mr. E. W. Evans (Natal) seconded the resolution. He said that if South Africa was ever to compete in the markets of the world, they must have closer settlement, and they must also have every facility for the sending of their produce to the markets. Roads could not be improved and railways could not be constructed without money; this money must be provided by the State, and the State could not provide it if there were not a sufficient number of people in the country to contribute

by taxation. They also had a duty to the Empire to think of. In South Africa they had the land; in England they had the people, who must be fed, and who must be given inducements to emigrate. As an instance of what could be done, he pointed out that in Australia men were making handsome livings on a hundred acres of paspalum, and paspalum did well over large areas in Natal. With regard to expropriation, he said that it was meant to apply to the land which was not being used, and which was being held in order that the owners might benefit by the exertions of others. He wished to correct the mistaken idea that many farmers had with regard to the meaning of expropriation, pointing out that land that is not being properly occupied would be purchased by Government at a reasonable price.

Mr. Mallison (Cape) said he did not think the time had yet come in the history of South Africa when it was necessary for them to ask the Government to adopt expropriation. He was opposed altogether to the idea of expropriation. A farmer ought not to be obliged to sell land if he did not wish to. He further pointed out that in New South Wales it had been admitted by the Minister of Agriculture there himself that expropriation had proved a failure. Unsuitable land was often expropriated, and land that was too far from the railways to admit of being profitably farmed. He moved as an amendment:—

"That this Union is of opinion that closer settlement is essential to the true agricultural progress of South Africa, and therefore urges upon all South African Governments the desirability of purchasing suitable land for the purpose of disposing of it to suitable settlers by lease or otherwise."

Rev. Mr. Scott (Natal) also expressed himself in opposition to the principle of expropriation. There was no one who desired more than he did to see South Africa settled with a large white population, but this was not the way to go about getting the population. He said, too, that close settlement was not suitable for Natal; the land of that Colony was too poor. No white man could keep a family on a smaller acreage than three or four thousand acres.

Mr. C. G. Lee (Cape Colony) spoke in favour of closer settlement, but as to the matter of expropriation, they must go very carefully. He considered that if they asked for expropriation at the present time they would be doing themselves harm. (Hear, hear.) He thought that they must wait until closer settlement had been actually proved a success.

Mr. Mitchell (Natal) said the question turned upon the matter of locality; how far the locality was from the railway, what the means of communication were, and what the land was like. As regards expropriation, he said that where suitable land could be obtained in the open market, they had no need for expropriation, but in such a Colony as

Natal, where all the best land that was not in use was locked up, belonging to people living in the Old Country who were waiting until their land went up in value before they put it in the market, at the same time that there were prospective settlers looking for land, expropriation was necessary.

Mr. D. M. Brown, M.L.C. (Cape) also spoke in favour of closer settlement and expropriation. As Mr. Mitchell had said, it was a matter of locality and means of communication.

Mr. Nicholson said that if expropriation was desirable in Natal, let Natal adopt it by all means, but the conditions were vastly different in the Transvaal, and he accordingly thought that they should not pass such a sweeping resolution as that which was before the Conference.

Mr. Hosking withdrew his motion in favour of the amendment, which now became the original resolution, and was carried.

AGRICULTURAL STATISTICS.

Mr. Marwick (Natal) moved:—

"This Union is of opinion that, with a view to the constantly increasing production of grain in South Africa, steps should be taken to provide reliable statistics in respect of our main crops."

Mr. P. J. Du Toit (Cape Under Secretary for Agriculture) read an interesting paper on agricultural statistics, which was published in the last issue of the *Journal*.

Upon the motion of Mr. Lee (Cape) a rider was added, urging the Governments and Administrations of British South Africa to appoint a representative to a special conference to devise a uniform system, and in this form the resolution was carried.

S.A. JUDGES' UNION.

Mr. Poultney (Transvaal) moved a resolution to the effect that the Union establish a South African Association of Judges in connection with the Union. He said they needed an association of judges comprising the best men from all over South Africa.

Mr. C. G Lee (Cape) seconded.

Mr. E. W. Evans (Natal) moved as an amendment:—

"That this Union recommends each agricultural union for form a judges' association within its own province or territory or uniform lines, and with uniform rules, with the intention of combining together to ultimately affiliate with this Union."

This amendment was carried.

OTHER RESOLUTIONS.

The following resolutions were carried, with little or no discussion:

S.A. NATIONAL EXHIBITION.

"That this Congress agrees to support and assist as far as possible

the exhibition of South African products and manufactures (including other articles which are foreign to this country in their production and manufacture) to be held in Capetown during the first session of the South African Union Parliament." [Moved by Mr. McDermott (Cape)].

THE C.S.A.R. AND LIVE STOCK.

"That the C.S.A.R. be requested to supply adequate accommodation for off-loading live stock at Johannesburg." [Moved by Mr. Hunt (Transvaal)].

WILD OSTRICHES.

"That, in view of the importance of the ostrich industry and the absence of reliable data concerning the wild birds of Africa, the Governments of South Africa be requested to collect data regarding such wild birds, and in addition at least twelve sets of feathers of wild birds be collected from each State in Africa and a report on the same be obtained from farmers and dealers." [Moved by Mr. Baily (Transvaal)].

DAMMING OF SLUITS.

"That this Union would strongly urge upon the farmers of South Africa to do their utmost to dam the sluits on their farms." [Moved by Mr. Mitchell (Natal) as an amendment to original resolution moved by Mr. Van Zyl (Cape)].

DESTRUCTION OF JACKALS.

"That this Conference brings to the notice of the several Governments the necessity for immediate action in regard to the jackal pest, and the desirability of disseminating information as to the best means of combating this scourge." [Moved by Rev. Mr. Scott (Natal) as an amendment to original resolution moved by Mr. Van Zyl (Cape)].

CONCLUSION OF PROCEEDINGS.

A hearty vote of thanks was accorded the President of the Union (Mr. Robertson); and votes of thanks were also passed to the various Departments of Agriculture of South Africa, for their help and sympathy, to the gentlemen who had read papers to the delegates on various subjects at the Conference, to the Mayor and Burgesses of Durban, and the Durban Club for their hospitality during the stay of the delegates in Durban, the outgoing Secretary (Mr. Nicholson), the press representatives present, the members of the Natal Agricultural Union, who had helped to make the visit of the delegates from the other Colonies a success, and to the President and Secretary of the Natal Agricultural Union for their labours in the same direction.

The proceedings were brought to a conclusion with cheers for the outgoing and incoming Presidents and Secretaries, and a short valedictory address by the President.

OFFICE-BEARERS, 1909-10.

The following are the office-bearers of the Union for the ensuing year:—*President*: Mr. E. W. Evans (Natal). *Vice-Presidents*: The Presidents of the various Colonial Unions, Mr. P. W. Michan, M.L.A. (Cape), and Rev. Jas. Scott (Natal). *Secretary*: Mr. D. M. Eadie. *Executive Committee*: Natal: Messrs. Mitchell, Marwick and Leuchars; Mozambique: His Excellency Governor Cardoza, and Messrs. Connacher and Barrett; Cape Colony: Messrs. C. E. Evans, Malleson and Edmeades; Transvaal: Messrs. Hunt, Van Alphen and Pott; Rhodesia: Messrs. R. A. Fletcher, M.L.C., Cripps and Jobling.

It was decided to hold the next Conference at Capetown, the date to be left to the Executive Committee to fix.

Consumption of Maize.

WHAT NATAL FARMERS REQUIRE ANNUALLY.

As announced in a recent issue of the *Journal*, we have for some months past been making inquiries as to the quantities of maize consumed on farms in Natal. Special forms were printed and sent to every farmer in the country, with a request that they be filled in and returned as early as possible. These forms are now all in, and we are accordingly now able to publish the results in detail of our inquiry. Special care has been taken in the collection and compilation of these figures, and the results may be taken as approximately correct.

The following is the statement which has been compiled, totals being given for each of the Magisterial Divisions of the Colony:—

CONSUMPTION OF MAIZE ON NATAL FARMS.

Natal.—*Coast*:	Muids.
Lower Umzimkulu	6,800
Alexandra	10,400
Umlazi	9,000
Inanda	23,200
Lower Tugela	24,250
Total	73,650
Midland:	
Impendhle	4,950
Alfred	4,250
Ixopo	16,000

Upper Umkomanzi	20,850
Umgeni	20,000
New Hanover	24,300
Lion's River	16,250
Umvoti	16,800
Krantzkop	3,850
Total	127,250
Upland:	
Underberg	5,100
Polela	6,000
Upper Tugela	5,150
Estcourt	23,400
Weenen	4,200
Klip River	13,100
Umsinga	650
Dundee	18,750
Newcastle	13,900
Vryheid	12,000
Utrecht	14,650
Paulpietersburg	6,000
Babanango	3,200
Total	126,100
Total for Natal	327,000
ZULULAND.—*Coast*:	
Mtunzini	5,100
Lower Umfolosi	850
Total	5,950
Upland:	
Nqutu	1,000
Nkandhla	650
Emtonjaneni	2,650
Mahlabatini	300
Ingwavuma	100
Total	4,700
Grand Total (Natal and Zululand)	337,650

Earthnuts and Their Culture.

By W. R. BEATTIE,
Assistant Horticulturist, U.S. Bureau of Plant Industry.

(*Continued from page* 367.)

VARIETIES OF EARTHNUTS.

THERE are not more than five or six distinct varieties of the earthnut grown in the United States, but these few varieties represent at least three separate types. By classifying the varieties of earthnuts according to types we have first the large-podded, or Jumbo, nuts and the small-podded nuts. These types are sub-divided into bunch and running nuts. Pods and nuts of the more important commercial varieties are shown in an accompanying illustration.

Those varieties having a bunch habit of growth are most generally grown, owing to the fact that they may be planted closer together than the running varieties. The bunch varieties are also more easily cultivated and harvested than the runners.

VARIETIES FOR MARKETING.

For vending purposes, where the nuts are roasted and sold from the first stands, the large-podded varieties, including Virginia Bunch and Virginia Runner, are in greatest demand, although considerable quantities of Spanish and North Carolina are used for this purpose. For shelled nuts the smaller nuts of the large-podded stock are employed; also the greater part of the crop of Spanish, North Carolina, and Tennessee Red varieties. A large percentage of stock that is shelled is of the variety known as Spanish.

VARIETIES FOR STOCK FEEDING.

When earthnuts are grown exclusively for feeding purposes the Spanish is undoubtedly to be preferred. If it is desired to market the high-grade portion of the crop and feed the remainder, the question of variety to be grown will depend largely upon locality. Many growers throughout the earthnut area follow the practice of planting several acres of Spanish earthnuts and disposing of all of the better-grade nuts to some factory for shelling purposes, the vines and poorly filled pods being fed to the farm animals. The Spanish earthnut can be grown under a much broader range of conditions than can the large-podded sorts, and should be employed where the season is short.

This variety also produces a heavy yield of vine and is desirable for forage purposes. The Tennessee Red is very similar to the Spanish in habit of growth and is desirable for stock feeding, but as this variety does not sell readily upon the market it is not generally recommended.

THE USES OF THE EARTHNUT.

To most persons the earthnut suggests only the article as it appears for sale whole or shelled and salted, but during recent years the uses of earthnuts have become numerous, and include a wide range of utility. The demand for earthnuts for use in the manufacture of food preparations is constantly increasing. By-products of the earthnut are now being employed extensively in the manufacture of feeds for farm stock and dairy cows, and the plant is being largely utilised as forage and as a soil renovator.

THE USES OF EARTHNUT BY-PRODUCTS AS FOOD FOR LIVE STOCK.

In the factories where earthnuts are cleaned, shelled, and graded ready for the market there is always a certain percentage of cleanings and inferior stock that can readily be turned into stock foods. The outside shell, or hull, of the earthnut is rich in food materials but is extremely difficult to reduce to a condition in which it can be fed. In large cleaning factories the shells are generally used as fuel, and the ash resulting therefrom is valuable as a fertiliser, often containing as high as 3 per cent. of phosphoric acid, 9 per cent. of potash, and 6 per cent. of lime.

The thin brown covering of the nuts has a feeding value almost equal to that of wheat bran. These hulls are especially desirable for mixing with the smaller particles of broken nuts for stock feeding. In large factories where earthnuts are prepared for the manufacture of earthnut butter and similar preparations the waste in the form of small particles of the meats and the germs is considerable and is sold to farmers for feeding purposes. In some cases the waste is mixed with a portion of the hulls and finely ground or chopped before leaving the factory. Earthnut hulls can not readily be ground by means of a burr mill, but require some form of chopping or shredding process.

Broken nuts and germs are used largely as a food for hogs, and both should be fed in moderation and in combination with some grain, as the earthnut feed by itself will produce a hog having soft fat and inferior meat. The famous Smithfield hams and bacon come from hogs that are partially fed on earthnuts, the practice being to turn the hogs into the earthnut fields after the crop has been gathered and allow them to glean the pods that were lost in harvesting. The principal objection to the use of earthnut by-products as stock feeds is their tendency to become rancid very quickly. The germs can make good earthnut butter

for home use. The earthnuts may be roasted before or after shelling, but in either case the oven should be only moderately hot and the earthnuts should be stirred frequently. After roasting, rub off the skins and screen out the small germs, or hearts. In grinding, use the finest plate on the grinder and screw up the tension until the crank will be quite hard to turn. If the pulp is too coarse after one grinding it may be run through a second time. It will not be necessary to add anything but a little salt to the butter, but if desirable the butter may be thinned by the addition of a little olive oil.

The Importance of the Earthnut as a Farm Crop.

In sections where the soil and climate are suitable the earthnut is rapidly becoming a crop of general farm importance. In the Southern States of America earthnuts can be grown under a wide range of conditions, and the product can be used for several purposes. Earthnuts are valuable as a substitute for cowpeas, especially on certain soils that are not adapted to the growing of the cowpea. In many sections where the clovers and other soil-renovating crops will not withstand the heat and drought of the summer months, the earthnut will thrive and make an excellent growth. A crop of earthnuts for forage can often be grown after the removal of oats or some other spring crop, and although they may be badly overgrown by crab-grass, the tops may be mown with the grass for hay, and the hogs turned in to root out the nuts.

Throughout Georgia and the surrounding Gulf Coast States the earthnut is extensively used for planting in the alleys between the rows of mealies. The earthnuts are planted at the time the maize is given the last working, and are allowed to grow as a catch crop among the mealies. After the maize is pulled, cattle are turned in to eat the fodder and the earthnut tops. Following the cattle the land is pastured by hogs to clean up everything that remains. In this way most of the nitrogen stored by the earthnut roots is left in the soil. Earthnuts can be planted between rows of cotton in the same manner.

The Value of Earthnut Hay for Feeding Purposes.

The tops of the earthnut plant when cut and cured in the same manner as other legumes will produce a hay that is almost equal in feeding value to the best clover hay. By planting the Spanish earthnut in rows from 24 to 30 inches apart and quite closely in the row and by giving the crop about two cultivations, it is possible to produce from one to two tons of hay to the acre. After the hay is removed the pods can be turned out by means of a plough, cured, and stored for winter feeding, or hogs may be turned in to gather the crop. The following table shows the comparative value of eathnut hay.

TABLE I.—*Comparative Analysis of Earthnut Hay and other Hays.*

Dry Matter.	Protein.	Carbohydrates.	Fats.
	Per Cent.	*Per Cent.*	*Per Cent.*
Earthnut hay	11 75	46.95	1.84
Earthnut, entire plant	13.48	36.28	15.06
Clover hay	12.84	48.31	2.11
Timothy hay	7.17	52.94	1.97
Cowpea hay	19.72	45.15	4.04
Lucerne hay	16.48	42.62	2.03

Earthnut straw, consisting of the entire vine after the saleable nuts have been removed, has a somewhat higher feeding value than the tops alone, due to the fact that many of the inferior pods are left in the straw. Earthnut straw is, however, not so bright or palatable for feeding as are the earthnut tops when cut and cured, especially for hay.

THE VALUE OF THE ENTIRE EARTHNUT PLANT AS FORAGE.

Throughout that portion of the Southern States of America where field maize does not yield a satisfactory crop, the place of maize for feeding to animals may be largely taken by the earthnut. On some ranches where a large number of work animals are maintained the Spanish earthnut, including the entire plant, is practically the only feed used.

The earthnut vines and nuts when chopped or ground together form almost a balanced ration for a dairy cow. The following table will give some idea of the comparative value of earthnut products and other feeding stuffs.

TABLE II.—*Comparative Analysis of Earthnuts and other Feeding Materials.*

Dry Matter.	Protein.	Carbohydrates.	Fats.
	Per Cent.	*Per Cent.*	*Per Cent.*
Ground maize and oats	9.6	71.9	4.4
Mealie meal	9.2	68.7	3.8
Wheat bran	15.4	66.4	4.0
Cotton seed meal	42.3	23.6	13.1
Earthnut kernels	26.6	16.7	42.0
Earthnut vines	10.0	42.0	3.6
Clover hay	12.4	33.8	4.5
Lucerne	14.3	42.7	2.2
Earthnut, whole plant	18.4	40.1	21.5

THE USE OF EARTHNUTS FOR FATTENING HOGS.

As already suggested, the earthnut is a valuable feed for use in preparing hogs for market, the usual custom being to turn the hogs into the

earthnut fields and allow them to glean whatever is left after harvesting. In some sections earthnuts are being grown primarily for feeding to hogs. Poorly filled nuts, broken peas, the germs, and waste products generally are fed to hogs during the earlier part of the fattening period. A hog that is fattened exclusively on earthnuts will not yield a desirable class of meat or lard, as the meat will lack firmness and the lard be soft and oily. Toward the end of the fattening period the hog should be fed exclusively on mealies. Hogs will eat considerable of the earthnut tops when pastured on them, and the plan of dividing the field into small areas by portable fences and allowing the hogs to gather the peas is perhaps the most economical.

METHODS OF HANDLING AND CURING EARTHNUTS FOR FORAGE.

Where the entire earthnut plant is to be stored and used for feeding to stock the work of curing and caring for the vines should be very much the same as in curing cowpea hay, although the earthnut vines will cure more rapidly than those of the cowpea. The vines are ploughed from the soil or lifted by means of a potato digger, and after being allowed to lie exposed for a few hours are raked into very small windrows by means of an ordinary hay rake. After partially drying in the windrows the vines are put up in small shocks, preferably around poles. The main object in the handling of earthnut vines for forage will be to get the stems and peas properly cured without losing the leaves, and in order to do this it is necessary to keep them in bunches and to dry them gradually. After the vines are sufficiently dry they may be stacked around a pole or hauled to the barn and stored in the hay mow. Where the stacking method is employed the stacks should be rather small, say not over a ton each.

Earthnut vines for forage purposes can be handled in the same way as those of the cowpea and yield a very desirable class of forage. Persons who have used the earthnut exclusively for feeding purposes claim that they have had no difficulty in feeding it to all kinds of work animals, even driving horses. It is well, however, to feed only a part ration of earthnut vines at first and to observe the animals until they become accustomed to this form of diet. Under ordinary circumstances the plant is fed without removing the nuts, but it may be well in some cases to pick the earthnuts from the vines and grind them, shell and all, and then feed as a meal with the vines.

The farmer who interests himself in clover and lucerne is the one who is now looking so prosperous.

Maize Export.

SOME INTERESTING FIGURES.

THE following statement, showing the numbers of bags of maize shipped oversea from Port Natal during the nine months ended September 30th, 1909, has been supplied to us by the Port Captain, and is here published as it will probably prove of interest to many of our readers. The figures include shipments to Cape ports:—

EXPORT OF MAIZE.

Statement showing number of Bags of Maize exported through Port Natal under Grade Certificate during nine months ended 30th September, 1909, from Natal, Orange River Colony and Transvaal Farms.

Description.	Produce of Natal.	Produce of O.R.C.	Produce of Transvaal.	Total.
White Flat:	Bags.	Bags.	Bags.	Bags.
Choice	72,190	6,611	4,155	82,956
F.A.Q.	50,608	114,839	59,746	225,193
Below Grade	—	21	11	32
Total	122,798	121,471	63,912	308,181
White Round:				
Choice	—	100	—	100
F.A.Q.	—	36,201	3,926	40,127
Below Grade	—	101	—	101
Total	—	36,402	3,926	40,328
Yellow Flat:				
Choice	1,293	377	200	1,870
F.A.Q.	4,698	6,396	1,348	12,442
Below Grade	—	—	—	—
Total	5,991	6,773	1,548	14,312
Yellow Round:				
Choice	396	17,696	1,484	19,576
F.A.Q.	820	139,932	8,659	149,411
Below Grade	—	—	—	—
Total	1,216	157,628	10,143	168,987
Mixed:				
Choice	1,904	1,313	4,074	7,291
F.A.Q.	64	40,772	443	41,279
Below Grade	—	400	3	403
Total	1,968	42,485	4,520	48,973
GRAND TOTAL	131,973	364,759	84,049	580,781

Natal Bee-Keepers' Association.

MONTHLY NOTES AND COMMENTS.

W. C. MITCHELL, Hon. Secretary, Cedara.

GOOD work was done at the general meeting held at the Natal Creamery on Wednesday, October 13th. The statement of accounts, etc., reflected a membership of 57, with a cash balance of over £6. This, taking into account the short time the Association has been started, was considered highly satisfactory. Rules were passed; the proposed show received considerable discussion, and also the highly important subject of foul brood legislation, whilst the equally important one of marketing honey also received attention. These and other matters will be dealt with under their respective heads in these pages. It is hoped that printed copies of the rules will be in the hands of all members shortly. These were drafted by the committee, presented to the general meeting, and duly passed.

* * *

All members present at the meeting reported that their bees were doing well. Let us hope that this is a good omen for the ensuing season.

* * *

Miss Pullinger, of Malvern, who is shortly leaving the Colony, is disposing of her apiary. This is a good opportunity for securing some strong colonies at a reasonable price.

* * *

It is proposed to adopt an Association honey label. Mr. Fuller and the Secretary have been appointed as a sub-committee to deal with the matter, and they will be pleased to receive designs and suggestions from members who will be so good as to submit same.

* * *

All South African bee-keepers will be pleased to hear that the 100 queens that were to have arrived for the Cape Government have been stopped. Mr. Attridge writes to say the importation has fallen through. The news only reaches me just in time for insertion in these notes, so I will be brief—and American—Brother bee-keepers shake.

FIRST ANNUAL SHOW.

It has been arranged to hold a show sometime in either April or June, the exact date to be announced later. It is hoped that every member who can possibly stage an exhibit will do so. The following prize-list and regulations are published for the information of members, but it must be distinctly understood that the committee reserves the right to amend these in accordance with funds in hand or should any other circumstances necessitate. All judging will be done on a scale of points fixed by the Association. Country exhibitors can have their exhibits staged for them by the committee, and show stands will be protected with netting to protect the exhibits from damage. Any member wishing to dispose of his exhibit can have same sold by auction; the Association will attend to this, charging a commission of 10 per cent.

Class 1.—Exhibit of hives and appliances, to occupy not more than 30 square feet: 1st, 20s.; 2nd, 10s.

Class 2.—Any Colonial-made appliance, other than hives, price to be stated: 1st, 20s.; 2nd, 10s.

Class 3.—Beeswax, not less than 3 lb.: 1st, 10s.; 2nd, 5s.; 3rd, 2s. 6d.

Class 4.—Foundation comb, Colonial-made, not less than 5 lb.: 1st, 10s.; 2nd, 5s.

Class 5.—Comb honey, 12 section: 1st, 10s; 2nd, 5s.; 3rd, 2s. 6d.

Class 6.—Comb honey, 3 shallow frames: 1st, 10s.; 2nd, 5s.; 3rd, 2s. 6d.

Class 7.—Liquid honey, 12 one-pound bottles: 1st, 10s.; 2nd, 5s.; 3rd, 2s. 6d.

Class 8.—Granulated honey, 12 pounds: 1st, 10s.; 2nd, 5s.; 3rd, 2s. 6d.

Class 9.—Observatory hive, with bees: 1st, 15s.

Class 10.—Exhibit of honey, wax, etc., staged for effect, to occupy a space of 3 feet by 3 feet: 1st, 15s.; 2nd, 10s.; 3rd, 5s.

Class 11.—Educational exhibit.

* * *

RULES AND BYE-LAWS.

The following rules were passed at the meeting on the 13th:—

1. The Association shall be called the Natal Bee-Keepers' Association.

2. The aims and objects of the Association shall be the encouragement, improvement and advancement of bee culture in and throughout Natal; to educate, assist and bring together bee-keepers and work for the humane and scientific treatment of the honey bee; to supply the market with honey produced in Natal.

3. A general meeting shall be called at least once annually for the election of officers, presentation of report and balance-sheet and the transaction of any other business. The meeting shall be held in Maritzburg during Show Week. The Secretary shall give each member fourteen days' notice of such meeting.

4. The officers of the Association shall consist of a President, Vice-Presidents, Auditor, Secretary and Treasurer and six other members of committee, who shall have power to add to their number as found necessary. At all committee meetings three shall form a quorum. Any member of committee absenting himself from three consecutive meetings shall, at the discretion of the committee, cease to be a member of same.

5. The Secretary shall be authorised to call a meeting of committee whenever business shall require it.

6. A special general meeting of members shall be called by the Secretary whenever any five members of the Association shall, by notice in writing stating the reason for their request, require him to do so. The Secretary shall give fourteen days' notice of such meeting, stating the object for which it is called.

7. The committee shall have power to make and amend bye-laws, provided always that such bye-laws be not in conflict with rules made at a general meeting.

8. The committee shall have power to refuse membership to the Association and to remove from the list of members the name of any person whose conduct, in their opinion, has been, or is likely to be, injurious to the Association. Such power shall only be exercised by a three-fourths majority of the committee.

9. The subscription to the Association shall be 2s. 6d. yearly, payable in advance, and shall become due on the first of June in each year. This does not include delivery of the official organ of the Association.

10. All official notices of the Association shall be published in the official organs of the Association.

11. Every member shall be supplied with a copy of the rules and bye-laws, and any member not conforming thereto is liable to be dealt with under Rule 8 hereof.

12. These rules and regulations of the Natal Bee-Keepers' Association may be altered, added to or modified at any general meeting, the member or members wishing to propose such alteration to give at least seven days' clear notice of same to the Secretary in writing.

Bye-Laws.

(1) Association honey labels can be obtained from the contractors, Messrs. . . . . @ . . . . . per 100.

(2) No member shall sell honey at a lower price than 1s. per bottle for extracted and 1s. per section for comb honey, weighing one pound

and 12 ozs. (minimum) respectively. The above prices to be altered by the committee as found necessary, of which notice will be given to members.

(3) The official organs of the Association shall be the *Natal Agricultural Journal* and the *South African Poultry Journal.*

* * *

In explanation of Bye-law 1, it should be stated that when a design for an Association label has been fixed tenders will be called for to supply these to members in lots of 100 and over. It is thus hoped to secure a label which will, in addition to securing a more uniform package for the produce of members, be at the same time neat, cheap and attractive.

* * *

Several requests have been received from members for information regarding the Isle of Wight bee disease. I hope to be able to publish a short digest in next issue of a description of the disease as furnished by the *Journal* of the British Board of Agriculture.

* * *

Owing to lack of space I am also unable to furnish in this issue a first prize essay on the subject of bees and bee-keeping written by Miss Isobel Kinsman, of the Girls' Government School, Ladysmith. This essay was written subsequent to a lecture delivered on the subject recently, and the writer is to be congratulated on her grasp of the subject as reflected by her work.

DISTRICT NOTES.

Camperdown.—Mr. J. W. Gavin reports bees in good shape, although no appreciable amount of nectar is so far being secured. Yellow and white pollen is being gathered from wattle and wild flowers.

Deepdale.—Mr. F. H. Harrington reports queens active, but no swarms during September. Nectar being gleaned from bottle brush and fruit bloom. Yellow pollen from wild daisies.

New Hanover.—Mr. W. T. Hibbert reports hives full of bees and foundation in extracting frames being drawn out; no swarms to the end of September. Light honey being gathered from wattle (?), syringa, and fruit bloom, whilst yellow to greenish yellow pollen is being gathered from chick-weed and syringa. Strong winds have adversely affected the bees.

Transferring.

By APIS MELLIFERA.

WHEN any person undertakes to do a thing that such an one has neither had the good fortune to witness an experienced operator perform, nor to read a description of just how it should be accomplished, in fact, been unable to gain any information whatever, I am under the impression that very soon little knacks will be developed, and after further experience perhaps abandoned for better ones, until the individual has developed a system which, in his or her opinion, is the best. Such was my position when I commenced bee-keeping, and the recollection of the many difficulties I then experienced has induced me to write a description of my method of transferring from wood and iron buildings.

First we will collect our tools, etc., as if for a journey of, say, fifty miles, thus making it imperative to have the bees enclosed in a bee-tight box.

Tools.—Veil, smoker, jimmy, hammer, gloves, cold chisel, knife, screwdriver, scissors, sacks, punch, tennon saw, chisels, nailclaw.

A box to enclose the bees can be made of two milk boxes; choose two good ones. Make them into one by knocking the tops and bottoms off and then nail the two together with two battens on each side and two on the ends, using nails sufficiently long to enable you to clinch them on the inside. Now make two frames on which you will nail perforated zinc. This can be made by cutting strips off the tops and bottoms, choosing the best, and not forgetting to strengthen it with at least two cross pieces. This frame can be made exactly the correct size by the inexperienced by nailing them (that is the strips) on to the box, and then nailing the zinc to the strips while in position. If you use 1 inch nails, and cut the heads off, they can be slipped through the perforations and are easily removed after you have tacked the zinc on to the frame. This will give you a perfectly fitting removable frame with the zinc attached. The job is not complete until you have made the box absolutely bee-proof. You may also require a dozen pieces of deal, 1 inch by 1 inch and a foot long. Don't try a single box, as you may be fortunate enough to secure a large swarm on a scorching hot day and suffocate the lot. Almost the last job of transferring I did, I secured six fine lots that almost filled the single boxes I was foolish enough to take with me, and when I opened them there were not enough live ones to make one colony! A loose piece of perforated zinc, about the same size as the one you have had to cut for the box, and a few nails of various sizes will about meet requirements.

I will now describe as nearly as possible the conditions of the lots

referred to above. No. 1 was the side of the building; to remove the sheet of iron I should have had to remove the facia board, which was about 6 inches wide, with the guttering on it. To remove the guttering would require breaking the parts asunder that are always soldered together; this I have never yet done; I prefer to draw the screw with the jimmy, large hammer and cold chisel. With a very little practice you will soon learn to get the points of the jimmy under the screw, hammering until the claw has caught firmly. Now place the cold chisel in the corrugation and you can hammer as much as you like and do no damage to the iron, which is no small consideration. I usually remove the lower and middle screws from the sheets of iron and then smoke a little before carefully pulling it out I pull it just sufficient to enable me to insert the tube of my smoker, and smoke gently to drive the bees off the combs.

I prefer when purchasing a smoker to remove the upper portion and have a cap about 2 inches deep with a ½ inch tube about 6 inches long soldered near the top; a perfect cloud of smoke from the right kind of fuel can be blown out. If the entrances to your hives are sufficiently deep it can be inserted right into the hives under the bees, so that there is no chance of the bees blowing it out as fast as you puff it in.

All the bees should be driven off the combs and made to cluster at the side of them; now gently draw out the sheet of iron as far as possible and keep it open with your screwdriver, if it is long enough, or failing this obtain a stick for the purpose. When removing the combs avoid scattering the bees all over the ground or you may accidentally tread on the queen, in which case you may expect trouble.

If only the facia board be present without the guttering, take one of the pieces of deal mentioned, sharpen it at one end and drive it under the facia board until there is only about three inches of it projecting; lift it with a screwdriver and drive another under the first piece, and then another in the same way until the board is forced loose. This should be done in two or three places to lift the whole board. If the board runs the whole length of the side of the house, cut it with your tennon saw. In this case it is necessary to remove only the screws so that you can take the iron off.

The six colonies were all in the one house, one on one side, three at the back, one on the other side and one in front. The iron and combs I removed from all before attempting to secure the bees, which, in the meantime, are allowed to cluster nicely, which is a great factor in enabling you to secure them with ease.

The one or two articles I have read on transferring advocate removing the screws with a screwdriver to avoid making any noise, and then obtain the bees and combs at one operation. I do not practice this plan for many reasons. The first is that all the screws but the last one, or

perhaps only one, are removed with ease, but that one, if you persist in the screwdriver method, will drive you fair crazy, and even then won't budge. This happened every time with me, and now I never use the screwdriver at all; start right off with the jimmy is now my method. The noise made while hammering drives the bees off to one side, making it a certainty that the queen is off the combs, which prevents her getting accidentally trodden on, as mentioned. That is the second reason, and a very important one in my estimation.

In cutting the combs I wear gloves and can then let them fall flat on the palms of my hands. In some cases where there are so many colonies in one building they will start robbing, in which case a canvas veil and a sting-proof suit will be absolutely necessary to get the job over as quickly as possible, as they sting like demons when once they have commenced robbing, and are not likely to quit until they have cleaned all the honey up.

After having removed all the combs I return to the lot commenced with, which should be found nicely clustered around the queen. Get the loose piece of perforated zinc which is to be pushed under the cluster, put the left-hand glove on, and obtain something which will enable you to drop the whole cluster into the zinc beneath. See that you have the zinc in such a position that no bees will drop over the edges of it. It is advisable to have someone to hold one of your boxes in such a position that after quickly withdrawing the zinc and bees you can shake them inside. They should be shaken with a sudden jerking back of the zinc that will shake practically all of the bees off, so that should they be inclined to take wing the zinc can be placed over the box until they commence crawling, after which you may safely remove it. The bees should not be dropped into the zinc until you are satisfied that you will secure almost all of them. To a great extent your success in transferring bees will depend on your being certain that you will secure the queen in the first lot of clustering bees you cut into the zinc, for after that they are again scattered. From the time I commence operations I search for the queen; should a few bees happen to fall I look amongst them to ascertain that the queen has not fallen; every comb that is cut is carefully examined in case the queen should be found on it. It is absolutely imperative that "Her Majesty" be found, and not until this is accomplished can you consider the job complete. Having shaken the bees into the box (presuming I have the greater portion), I flatten the zinc over the top and leave my assistant to care for them, whilst I search among the few that are left to satisfy myself that the queen is not there. I then return to the box with a knife, run it along the sides dropping a few at a time and search until I have secured and clipped her, when they are left for the scattered ones to cluster around her. The box should be stood on its side whilst this is taking place.

This lot was commenced at about 6 o'clock one Friday morning, and by 1 o'clock on Saturday everything was replaced with the boxes so full of bees that failure in transporting resulted.

With the above method, and this motto, "Search for the queen," I seldom meet with failure.

I do not trouble with the combs, as they are generally more bother than they are worth, but when I did I invariably gave them to an established colony to clean up, and not to the lot transferred, taking combs from the established colony for the new lot.

(To be continued.)

Division of Agriculture and Forestry.

REPORT FOR SEPTEMBER, 1909.

AT the Central Experiment Farm work has been considerably handicapped through the lack of transport animals. Twenty mules were received on the 17th of the month, of which ten were unbroken. These are now being carefully handled in preparation of general field work with heavy implements. A wood and iron stable has been built for their accommodation.

The sheep, of which mention was made in the report for last month, have arrived, and shearing has commenced.

WINKEL SPRUIT EXPERIMENT FARM.

Staff and students at this station are all engaged cutting and trucking sugar cane, about 30 tons per day being delivered to the Illovo Mill.

That portion of the Farm abutting on the railway line is being planted with ornamental forest trees, two acres of *Pinus canariensis* being already planted.

Three hundred citrus trees have been planted.

WEENEN EXPERIMENT STATION.

The harvesting of cereal crops is now commencing at this station. Four varieties of early barley have been cut. From appearance the Smyrna variety promises well, but detailed results can only be published when all varieties have been threshed. The results of wheat trials at this station promise, from the general appearance of the standing crop,

to bear out those obtained previously, Standard Fife, Menenieu and Federation varieties all looking well.

Ground nuts and beans have been planted between lines of orchard trees. Eight new varieties of grape have been added to the vineyard and a plot of cantaloupe melons also planted.

CHIEF FOREST OFFICER'S REPORT.

For the month of August the Chief Forest Officer reports:—

During the tour of inspection in the Ingeli district of Alfred County at the latter end of the month, I realised very forcibly the immense dislocation of bush and farm transport caused by the regulations resulting from the East Coast Fever outbreak below Harding. All sawing and sale of every kind of forest produce is absolutely stopped, while the farmers —to whom we naturally look for road equipment—cannot get their own stuff to market, and some of them are in consequence pressed for ready cash. Rates for hired transport are prohibitive, and if there is any demand for railway sleepers from the Ingeli forests—which are full of suitable material—the tenders would have to be subject to delivery at the bush. At 'Ngomi a sawyer has received an order from the N.G.R. Department for a sample lot of 150 waterboom sleepers at 4s. delivered in Vryheid. Certainly there can be no comparison between the roads—the road from Zuurberg through Harding being in postcart order, while the Vryheid-'Ngomi road will cease to be even a track if not attended to—and it remains to be seen if railway sleepers can be delivered at Vryheid from 'Ngomi at a profit at 4s. The sample lot will be cut in a privately-owned portion of the 'Ngomi Forest, and I suggest that lemonwood samples be also called for. In all cases the N.G.R. should be particular that no sap-wood is paid for.

Foresters Purser, Chilvers and Fernando have been engaged on the completion of the markings of their cutting-sections. The last-named has been authorised to ring the cumberers or old-barks that cannot repay the cost of felling, but the canopy of which prevents regeneration. Ninety trees are so treated in A section, Xalingena. The Forester reports that as they are of great girth the ring-cuts could not be carried into the sap-wood without unnecessary expense, but the cambium has been well cut through and he expected to find the trees dead in a few months.

Forester Chilvers suggests that we should demonstrate departmentally, the value of equines in bush-work; and perhaps it would be good business, if the supply of sleepers required by the railway is large enough, to take on the contract, provide equipment ,and employ sawyers by sub-contracts. Such a course would not only improve the Zuurberg Forest by the removal of lemonwoods and give employment at a profit to many men, but would be an object lesson to those who are now afraid to make the change from oxen to equines in bush-work.

Forester Gryspeert reports that a local chief had over 200 men cutting timber in the Manguzi Forest at Maputa for nearly three months, doing immense damage, just to build a barricade round his kraal. The Forester thinks that rubber, now 6s. 9d. the pound, will rise to 9s., and states that tons of it could be collected in his district. Climate is, however, a great factor in this problem, and transport another: a railway would make realisation of this wealth possible perhaps. Forester Leigh, of Entumeni, has issued permits to cut 80 bundles of wattles and asks for instructions. I can only tell him that, in the anomalous state of things in Zululand, Natives are allowed the free run of forest reserves as well as their own reserves, and that he can only refuse permits when the forest produce is required for sale.

Forester Purser has been offsetting the Ingelabantwana. Forester Fernando has beaconed the new boundaries of the Emkazeni and repaired the whole length of the side. Forester Foster hopes to have the 'Ngomi nursery in complete order this month, but complains that he cannot get any of the numerous squatters owing arrears of rent to work. Neither will they pay their rent. I should like to take a very short way with them to prevent turning the forest into a criminal warren. A case now proceeding at Vryheid—the murder of a woman by a gang of these idlers—should throw some doubt over the system of rent-collection at present prevailing at 'Ngomi, and endorse the recommendation of the Magistrate, Ngotshe, to proceed at law in the ordinary course for the recovery of arrears, with costs of any lawyer employed.

Forester Purser is engaged on a case of poaching in the Gala Forest, near Bulwer, in which many Natives are concerned. Forester Foster mentions having come across in the 'Ngomi an animal he believes to be a honey-bear. It was about eighty yards away and looked like a brown bear, a little larger than a pointer dog.

E. R. SAWER,
Director, Division of Agriculture and Forestry.

Central Experiment Farm, Cedara,
20th October, 1909.

Unless you push yourself forward others will push you back. If you never try to do more than you have always done, you will never know how much you can do. Success will only smile on him who proves himself brave.

The Position of East Coast Fever.

LIST OF OUTBREAKS DURING SEPTEMBER-OCTOBER.

THE Chief of the Veterinary Division (Mr. W. M. Power) furnishes the following list of outbreaks of East Coast Fever that have occurred during the period 21st September to 20th October:—

Dundee District.—Outbreak on the farms "Cotswold," east of main line and north of Dundee—Vryheid, "Klip Rots," east of main line, and "Bosch Hoek," west of main line.

Umvoti County.—Outbreak on the farms "Summerford," sub-division of "Groet Reit" and "Welgevonden," "Mare's Manor," and "Summerville," sub-division of "Reit Vlei" and "Craigieburn."

Klip River District.—Outbreaks on the farms "Springvale," sub-division of "Schaaplaats," west of main line of railway, "Elandslaagte," west of main line, and "Reuit Kuil," east of main line.

Utrecht District.—Outbreak on the farm "Sportlespruit."

Krantzkop District.—Outbreaks on the farms "Doornhoek," "Scotsdale," "Ingela View," "Broeders Hoek," "Mist," "Wittekrors," and "Ungegund," sub-division of "Doorn Hoek."

Lion's River District.—Outbreaks on the farms "Good Hope," sub-division of "Oatlands," east of line, and "Ashley," west of main line.

New Hanover District.—Outbreaks on the farms "Fountainshill," sub-division of "Klein Noodsberg," "Welverdient," "One House," sub-division of "Forbesdale," "Ashendon," "Kruisfontein," "Mollissima," sub-division of "Dalton," Inanda Location, and "Blambletye," sub-division of York Settlement.

Camperdown District.—Outbreaks on the farms "Spitzkop," and "Melbourne," sub-division of "Valkop."

Upper Umkomanzi District.—Outbreaks on the farms "Hopewell," and "Alton," sub-division of "Lilliefontein."

Umgeni District.—Outbreaks on the farms "Wattle Grove," "Kersdale," "Claridge," "Dennyvale," "Faulklands," and amongst Sir Henry Bale's cattle at Hilton Road.

Alfred Division.—Outbreak on the farm "Enquabeni."

No record is kept of outbreaks in the following Magisterial Divisions:—The whole of the Province of Zululand, the whole of Victoria County, Umsinga, Vryheid, Ngotshe, Babanango, and Paulpietersburg.

Farm and Garden Notes for November.

By GEO. CARTER, F.R.H.S.

THE MEALIE MONTH.

IT is very little use talking about anything other than mealies this month, and even throughout the most of next month, in the midlands. All energies are directed towards getting as large an area as possible of this one staple crop in, and rightly so. One wonders for a moment what can be said about the crop, which, surely, every Natal farmer should know all about; but the loss is only momentary, for there is one outstanding item of failure, the reason for which cannot be pushed home too often. While I believe that a good many of our growers have reached very near perfection in this crop, the fact remains that the standard of the Colony as a whole is not yet a high one and that much improvement is possible *this year.*

I believe that one of the chief reasons for the eminent success of certain growers is the careful selection of seed, and inversely, that one of the chief causes of the low general grade is the want of selection. This is an oft-told tale, but the tale is generally told at the wrong time of the year, and forgotten when the planting time comes round. It needs to be pressed home *now,* at planting time. If we are to think of increasing our export trade the objective of *quantity* must have added to it the objective of *quality*—we must have clear, definite types—there must be no such thing marketed as a *mixed crop,* in either colour or variety. This mixing of colours and varieties is not confined to Natal only. I have handled a good many samples of grain from the Harrismith district this season, and in almost every case this was the one outstanding fault. As many of the Harrismith farmers are readers of this *Journal,* perhaps I may say in passing that unless the point of seed selection is attended to by them at once their produce will soon be unmarketable. And this remark applies to the oats grown in the same district also, the seed of which is now one of the most impure lots which I have seen in South Africa. Growers should remember that even a 3 per cent. impurity in the seed will have a very serious effect on the grain crop resulting, and every effort should be made to avoid planting such.

It may be that some of our readers have very little knowledge of the points to be considered in seed selection. Unfortunately this is not the time of the year when this work should be done, as the first part should take place in the ripe, standing crops. It is not enough that the grain offered should be large. It should be from a strong, healthy plant, a well-filled and shapely cob, and one quite pure and true to its variety.

The largest grain often occurs on a half-filled cob, and the "cob-faults" may be easily transmitted to the resulting crop. I will never forget one of our prize-winners telling me that he would not plant the seed with which he had taken first prize—he preferred to sell them, the reason being that a large proportion were from faulty cobs. This bears out a contention which I have made for some years, that the executive of all our agricultural shows should prohibit all exhibition of mealies which are *shelled* and have them all on the cob. There should be no such thing shown as a "sack" of shelled mealies, which anyone with time and labour can "fake" for the purpose. Each exhibit should be a definite number of "cobs," so that the primary points of a good mealie, length of cob, fulness of tip and butt, shape of grain, and proportion of grain to cob, may be decided in that form.

Now, how does this affect seed selection at this period? Each farmer, if he has been wise, will have his cobs selected for the above mentioned points, ready picked for shelling and planting now. And if there is a stack of unshelled mealies still to choose from the selection of cobs may be made on such lines yet—with, however, the one disability that the one who selects now knows not what manner of plant the cob was grown on. I believe that there will come a time when all seed mealies will be exchanged and sold on the cob, for in this form only can the purchaser be sure of the quality and purity of the seed.

To sum up these rather rambling remarks, I want to say: "Let every farmer look out his seed at once, and if it is not a good and pure type, and from good plants and cobs, *feed it to the horses and get something better.*" This may cost a few shillings in seed, but when one considers that the whole cost of seeding an acre of ground with mealies is only from one to two shillings, with the best of seed procurable, and that any little extra cost cannot be more than threepence per acre (while a choice of seed may, and probably will, mean an increase of many shilling on the crop value on each acre), then the point of economy in seed is not worth considering. The only other point to remember is to make sure the germination of the seed is right before sowing. I have nothing to say about varieties. Each farmer has his own fad on this point, or has proven by his own, or local, experience which kind will suit the soil best. One cannot recommend any one kind for the whole of Natal, and there are many first-class varieties to choose from now. Only let it be a standard sort, and not some miserable hybrid, without fixed characteristics, of which there are far too many marketed in Natal.

VEGETABLE GARDEN.

The chief crops to be attended to this month are Cauliflower and Celery. Both these are the better for a touch of cold weather before they are used, hence the seed should not be sown before November. As

soon as the nights get cold a crispness and flavour is added to them which comes in no other way.

CAULIFLOWER.

The only thing to be done this month is to sow the seed and make sure of getting perfect plants, remembering that a perfect seedling is half the battle with this crop. As November is not a good month for seedling raising in the open, you must get the standard seed bed principle to work, as mentioned in an earlier article. That is, after the levelling and firming the soil, sow the seed *on the surface* and cover with half an inch of sifted old manure only. Sow thinly, for practically every seed will get through by this method. Then, when the seedlings have four leaves each, thin out so that each plant has quite three inches each way in which to develop. This spacing will give ideal plants for moving into the permanent lines, with a trowel and a ball of soil, next month. All that is troublesome, but you will not regret the trouble when you see the perfect "heads" produced next May. The variety for this month's sowing is "Veitch's Autumn Giant," sometimes catalogued as "Italian Giant." The early varieties are left until January. We have several times scaled the "Autumn Giant" at 25 lbs. each, and not one of the new varieties of recent years has beaten it. Seed germinates in seven days.

CELERY.

Here again make a point of getting good, sturdy plants—but the method, for home use, is quite different. Celery is difficult to germinate in the open at any time during summer, the young seedlings being so easily burned off when scarcely above the ground. For home use only 50 to 200 good plants will be required, and these are best raised in a flat box of a handy size for carrying into the shade when necessary. The seed is fine, and should only be just covered slightly with sifted old manure. In about fourteen days the seedlings should be up, and in a month or five weeks they should be pricked off into other boxes spacing three inches apart each way. Some growers put them into the permanent trenches direct from the second box; others give them still another "shift" into the open garden first. Let there be no check for want of water at any time. More about the trenching next month.

KOHL RABI.

In the midlands and the coast belt there is great difficulty in getting turnips to "bulb" during the summer months. A very good substitute for these will be found in Kohl Rabi, which will "bulb" and grow perfectly all the year round. The quality is not equal to a turnip, perhaps, yet when turnips are unprocurable Kahl Rabi is an excellent substitute. When fully grown, the "bulb," or rather swollen stem (which is the edible part) attains to the size of a swede, but for house-

hold use it should be used when little bigger than a tennis ball. After that size there is a tendency to stringiness, particularly if watering has not been regularly attended to. The culture is exactly the same as for cabbage, except that the plants in the crop lines may be spaced a foot apart. The "purple" variety is the best.

FLOWERS.

The last sowing of Asters, Salpiglossis, Delphiniums, Snapdragons, Swan River Daisy and a few common annuals for autumn blooming should be made now, so that we may be free next month and January to consider those which will be classed as winter bloomers. This month also one must make plans for some items required to bloom next spring, these being either perennials or biennials, which do not bloom until the second season after sowing the seeds. A good many of our best perennials are best treated as annuals after all: for after once blooming well they will never again possess the same vigour and form, although they may grow on and throw flowers for several years. Columbines, of which the spurred singles are the most beautiful, Pentstemons and the closely allied Chelone, Foxgloves, Hollyhocks, Leucanthemums (Ox Eye Daisy) and Sweet Williams, all these, and some others, need sowing at some time between the end of October and the end of January, if we would have good plants to bloom next spring. In the colder districts at once; in the midlands a little later if you wish. The only reason for delay is that the plants will occupy the ground a month or two longer than is actually necessary. I mention these perennials and biennials because it is easy to forget them at the right season for sowing. It is not everyone who is in the habit of looking a year ahead in gardening, yet we must do this with this class. And I know the disappointment of remembering an important flower when far too late to sow it.

He who tears down without building better is a destructionist instead of a constructionist.

We learn from the *Standard of Empire* of the 24th September that a complete plant for the preparation of wattle bark in the disintegrated form in which it is used for the purpose of industry and commerce has been installed at the Government experimental station at Waerenga.

Science and the Farmer.

NOTES OF INTEREST BY FARMING EXPERTS.

THE milk of a mixed herd, well fed, should yield 1 lb. of butter per 27 to 28 lbs. of milk on the average of the year; where the separator is used, and skilled hands employed, a high-class Jersey or Guernsey herd may yield 1 lb. of butter per 20 lbs. of milk, or even less.—*James Long and J. C. Morton* (*"The Dairy"*).

No one of us would ever dream of getting the best results in output from a half fed man or animals, and plant life is practically the same. It always pays in the long run to stop economy when it means starvation of either man, animal, or plant. But the food given must be proper food, and the proper plant food necessary will depend upon the crop required and the nature of the soil employed, and this can only be determined by individual experiment.—*J. D. Davidson*

IRRIGATION AND CULTIVATION.

The success of irrigation cannot be made complete without cultivation, and it is a fault too commonly observed among irrigators that they are inclined to depend too much upon irrigation and not nearly enough upon cultivation. The retention of the moisture when once supplied to the soil by means of irrigation may be largely controlled by keeping the topsoil when pulverised so as to break up the capillary tubers. The more recent scientists all agree that the soil is full of small tubers, through which the moisture from below finds its way to the surface and escapes. If these tubes can be closed the water will not evaporate so readily. This is done by loosening the topsoil, not by stirring it to such a depth as to injure the root of the plant, but in a manner so as to break the tops of the tubes and throw a covering of loose soil over the ground, and at the same time destroy the robber weeds which not only use the moisture but take away plant food as well. This loose soil is a mulch—a blanket which prevents loss of moisture and protects against the direct rays of the sun. There are, of course, certain kinds of cereal crops, such as wheat and oats, which by ordinary planting do not admit of cultivation, and these, from necessity, naturally require a larger quantity of water than do the cultivated or hoed crops.—*Luke Wilcox* (*"Irrigation Farming"*).

SPROUTING POTATOES.

Lavallee and many others have found that sprouting potatoes in a well-lighted room increases the yield and earliness, and produces a more vigorous growth of vines and a larger starch content in the tubers. One explanation offered for the increase in yield is that the short, thick, stem developed under the above conditions bears many scales or leaves for its height, and it is from the axils of these scales, the place where the scale joins the stem, that the tuber-bearing branches are produced. The more scales produced, the more opportunity for the development of tubers. If the tubers start growth in the dark, either indoors or below ground, the scales are formed at longer intervals, and there are correspondingly fewer places for the production of tuber-bearing branches. Also, in the latter case, the leaf-bearing branches produced above ground are weaker. The system is considered essential in the Island of Jersey and the early potato-growing districts of the United Kingdom, and is practical to a small extent for the second crop in the Southern States.—*Samuel Fraser* (*"The Potato"*).

SOIL AIR.

A proper circulation of air in the soil is just as important as any other factor of plant growth. Nearly half of the volume of ordinary soils is occupied by air spaces. The air spaces in the soil wind in and out between the soil particles, just as they do in a pile of larger stones. If the layer of water on the surface of the soil grains becomes so thick as to stop the air passages here and there the soil is then too wet for most crops and needs drainage. Plants have no special breathing organs, the oxygen required in their breathing finding entrance all over the surface of the plant. Plant roots must therefore be supplied with air, and hence the soil must be porous enough to permit of free circulation of air. A good supply of humus and proper tillage will accomplish this result in clay soils. Sandy soils are usually too porous, needing humus to help them retain water. Another reason why air must circulate freely in the soil is that large quantities of oxygen are required to insure proper decay of organic matter to supply plant food. Also, carbonic acid gas is produced by the decay of organic matter, and this must escape easily to make room for the atmospheric oxygen needed in the soil. The movement of air in the soil is frequently shown by the bubbles which appear at the surface of soil just after a hard rain. As the water soaks into the soil it drives the air out, and bubbles may be seen at the surface if water enough is present to form them. One of the most important objects of ploughing is to loosen the soil and mix fresh air with it.—*W. J. Spillman, Agriculturist, in Charge of Farm Management Investigations, Bureau of Plant Industry.*

IRRIGATING POTATOES.

The most common mistake in the irrigation of potatoes is to turn in a large head in each furrow, permit it to flow repidly to the bottom of the rows, and then shut it off. This way of applying the water wets only the surface layer, and if it is not followed up immediately by cultivation a couple of days' sunshine will rob the soil of most of the water which has been applied and seal over the surface with a hard crust. In this condition the crops soon begin to suffer, and the unskilled farmer fancies that the only remedy lies in applying more water. A better plan is to turn a small amount of water into a deep furrow and permit it to run without stopping for hours or even for half a day. In this way the top layer is not saturated, the soil around the roots and beneath them receives a larger supply, and the surface may be cultivated shortly after each irrigation, so as to check evaporation and retain the moisture in the soil for the benefit of the crop.—*Prof. Milton Whitney, Chief U.S. Bureau of Soils.*

MILKING THE COW.

The first bacteria enter during the time of milking and are naturally from the cow and her surroundings. The manipulation of the udder works off hair, particles of skin, and in many instances particles of manure that adhere to the hair and udder. All of this material finds its way into the milk pail and carries with it great numbers of bacteria. The warm temperature and the presence of a congenial food supply that is in just the right physical condition cause these bacteria to multiply very rapidly, and unless something is done to check their growth souring or other evidence of decomposition will take place in a few hours. The rapidity with which these changes occur will depend almost entirely upon the temperature at which the milk is allowed to stand and the number of bacteria that find entrance to it. These facts are constantly in the mind of the careful dairyman. He knows that the first step is that of prevention. The work of milking should be performed in such a way that few bacteria will find their way into the milk. The milk should be cooled quickly and thoroughly immediately after it is drawn, in order to check the growth of those bacteria that will, under the best conditions, find their way into it.—*Edwin H. Webster, M.S., Chief of Dairy Division, Bureau of Animal Industry.*

Genius begins great works; labour alone finishes them.

Exchange Reviews.

WHAT OTHERS ARE THINKING AND DOING.

AN article in *Coltivatore* refers to the value of grape-vine prunings as forage. It is stated that such waste twigs possess 55 to 60 per cent. as much nutritive matter as meadow hay It is recommended that they be ground up and fed in moderate quantities.

Manuring Cabbages.

The following mixture is recommended by C. H. Shipston in a recent issue of the *Mark Lane Express Agricultural Journal,* for the manuring of cabbages where farmyard manure is not available, and, as is stated, will give excellent results:—6 cwt. per acre of pure dissolved bones; 1 cwt. sulphate of ammonia; 1 cwt. muriate of potash (or 4 cwt. of kainit). Top dressing when the cabbages are half grown with 1 cwt. per acre of nitrate of soda or nitrate of lime.

In-Breeding.

In a paper on In-breeding, Mendelism, and the Elucidation of Live Stock History, read at the Dublin meeting of the British Association for the Advancement of Science, Mr. J. Wilson emphasises the advantage of in-breeding, and cites the deer as an example in nature. "The strongest male retains command of a flock until he is ousted by some other animal, who is in all probability a younger brother or a son of the previous master male." The various theories of the origin of the Dexter breed of cattle are reviewed and discarded. "Mendelism shows clearly that the Dexter is a hybrid breed, the original races being a slender black race and a stout red one like the Devon breed of cattle. . . . . Mendelism is evidently going to be of great service to the historian of live stock."

Influence of Soil in Horse-Breeding.

A recent issue of the *Live Stock Journal* contains a useful article under the above heading. As the writer points out, there is no point which is of more vital importance to success in the breeding of horses than that the land on which they are bred and reared should be of a suitable character for the purpose. This, in fact, constitutes the chief fundamental requirement in horse-breeding, as all experienced breeders will agree. For instance, really heavy and massive Shire horses can be

raised only on rich and fertile land of a heavy character where the grazing is of the best, as well as very abundant. In the case of the light breeds of horses, also, richness of soil tends towards massiveness of shape, just the same as it does in the case of cart horses. But the requirements of this class of horse as regards suitability of soil are, of course, of a different nature to what they are in the case of the heavy Shire. They represent an altogether different type of horse, in which the development of mere weight of body is not the principal desideratum. The biggest and most powerful light horses can be bred on soil which would not be suitable or good enough in point of richness for producing really weighty and first-rate Shire horse-stock.

In no other direction does the nature of the soil exert a greater degree of influence upon the horse-stock bred on it than it does in regard to the size and quality of the bone, and also the quality of the structure intimately connected with the bone—namely, tendons, sinews and ligaments. The principal ingredients which go to build up the bones are lime and phosphates; hence, where the soil is deficient in these important constituents, the feed it produces does not contain a sufficient amount of bone-forming material to assure a full development of the bones in young horses, and under these unfavourable conditions they naturally remain light-boned and weedy. It is impossible to breed big-boned horse-stock on such unsuitable land. Of the various kinds of soils, no other is so favourable to the development of big bone—and that of the very best quality—as a good limestone soil. This is admittedly the most suitable for the breeding of good horses, and especially of light horse-stock of a tough and hard-wearing sort. The stoutest and best horses are bred on land of the limestone formation.

Effect of Soluble Salts on Growth of Sugar Cane.

In a recent issue of the *West Indian Bulletin,* the author, J. B. Harrison, discusses, on the basis of experiments extending over a number of years, the effects of long-continued applications of sulphate of ammonia and nitrate of soda on the productiveness of the soil, the effects of cultivation and of manures on the composition of the soil waters of the sugar cane fields, the relation between temporary and permanent alkalinity of soil waters, the proportion of nitrogen in tropical soil waters, and the concentration of the subsoil water.

The general reaction of the fertile heavy clay soils of British Guiana is slightly alkaline, and a decided and comparatively rapid increase of the alkaline salts in the soils under experiment was observed. This concen-

tration of salts exerts a decidedly injurious effect on the physical properties of the soil and on the growth of cane, but promotes the activity of nitrifying organisms. "The alkalinity of the soil may explain why sulphate of ammonia gives better results than nitrate of soda when applied in large amounts." The remedies suggested by the author's experiments are deep drainage and the application of gypsum, calcium phosphates, and other neutralising materials.

Composition of the Air of Cultivated Soils.

A series of investigations on the conditions which influence the composition of the soil air is reported by E. Low, in a recent issue of *Beitrage zur Keuntnis der zusammenstzurg der im Ackerboden befindlichen Luft Diss. Rostock,* from which the following conclusions are drawn. The soil air is richest in carbon dioxide in summer and poorest in winter, the amount apparently varying with the temperature and the consequent intensity of the decomposition of the organic matter and the formation of carbon dioxide. The air of sandy soils contains the least carbon dioxide, that of moor soils the most, the air of loam soils being intermediate in this respect. The carbon dioxide content varies with the humus content as well as with the physical properties of the different soils. It is smallest at the surface and increases with the depth, the differences in this respect being greatest in case of moor soils and least in sandy soils. The oxygen content stands in definite relation to the content of carbon dioxide, that is, the richer the soil air in carbon dioxide the poorer it is in oxygen, this being clearly due to the fact that the carbon dioxide results from the oxidation of humus.

Plant root respiration has a marked effect upon the carbon dioxide content of the soil air. The air of soils bearing plants is decidedly richer in carbon dioxide than that of bare soils, and the carbon dioxide content is greater in the vicinity of the plant roots than below them. The carbon dioxide content increases with the growth of the plants and with the rise of temperature. Soils bearing potatoes and lupines contain larger amounts of carbon dioxide than the same soils bearing other crops. This is attributed to the fact that potatoes and legumes have a higher rate of respiration than other plants. The application of barnyard manure is equally as effective as the root action in increasing the carbon dioxide content of soil air.

Cattle Feeding Experiment.

An experiment to compare the feeding values of decorticated cotton cake with the same weight of linseed cake and undecorticated cotton cake, given in equal proportions, was carried out by the Agricultural Depart-

ment of the University College of North Wales, the results of which were published in the *Live Stock Journal,* in its issue of July 30th. Two lots of bullocks, four in each lot, were selected and weighed on December 9th, and from that time till the experiment came to an end, on February 18th, both lots received an average daily ration per head of pulped roots, chaffed hay and straw, and a little long hay every evening, made up of 70 lbs. of swedes, 7½ lbs. of hay, and 7½ lbs. of straw. The decorticated cotton cake gave superior feeding results to those obtained from the use of the mixed cakes. The fact that the manurial value of decorticated cotton cake is considerably higher than that of the other two cakes furnishes an addition reason for its use.

Transferring Boric Acid from Cattle Food to Cow's Milk.

Investigations were conducted to show the possibility of transferring boric acid from cattle food to cow's milk, at Armstrong College, Newcastle, the results of which are contained in July 26th issue of *Mark Lane Express Agricultural Journal.* The main question: "Can boric acid get into milk as a result of feeding cows on food containing boric acid?" is answered in the affirmative.

However, the amount of boric acid that can get into the milk from food is small and could not possibly enable the milk to keep sweet for a longer time. As milk needs ¼ per cent. boric acid to produce any useful preservative influence, there seems no difficulty in distinguishing between milk preserved with boric acid and milk contaminated by the use of foods containing boric acid. If milk be found to contain more than 0·1 per cent. boric acid the milk has probably been deliberately preserved with some boric preservative, but if less than 0·01 per cent. boric acid be found in the milk, the source of that small amount of boric acid is to be looked for in the food of the cow; whilst if between ·1 per cent. and ·01 per cent. boric acid be found, the origin of the boric acid is uncertain.

Don't allow the boy who drives your cows to and from pasture to throw stones at them, nor to run them to see which one is the fastest on foot.

Reviews of Books.

FRUIT-PRESERVING.

"Successful Jam Making and Fruit Bottling." By Lucy H. Yates. Illustrated. London: Rebman, Ltd., 129, Shaftesbury Avenue, W.C. 1909. 2s. 6d. net.

Jam making, and fruit-preserving generally, is a subject in which, directly or indirectly, every farmer is interested. Whether he is concerned in turning to account the fruit which distance from the railway makes it unprofitable to market in its fresh state, by preserving it for home use or for the market, or whether he makes a point of setting aside a portion of his fruit crop every year for home use on health grounds, or whether he finds that, all things considered, it is preferable to preserve the bulk of his fruit and market it thus rather than in the raw state, he is always in some degree at least interested in fruit preserving, and even more so, in a direct way, is the farmer's wife.

Under present conditions in Natal, fruit preserving is a subject which is perhaps of more interest than it is in other countries. Whilst nearly every farmer grows fruit, it is only the most favourably situated as regards proximity to the railway and to the market who can hope to realise sufficient profit to repay them for the attention they have given to their orchards and the time they have devoted to and the time they have taken with the picking, sorting, packing, and marketing of their fruit. For the majority, the only way of turning their fruit crop to account, short of giving it to the pigs, is to preserve as much as possible of it in various ways. Some farmers find it a fairly lucrative proposition to market their fruit in this form, and, apart from this, there are always the requirements of the family to be considered and provided for in advance for the year.

There are people who can make excellent jam with first-rate keeping qualities; there are people who can make good jam, which, however, will not "keep" for more than a very limited period; there are others still who make "jam" which is neither wholesome nor palatable nor which will "keep." The book before us is one which will be found of value by all these classes, for the best jam-maker can always learn something. This is not an ordinary book of recipes: it is a useful little treatise on jam-making and fruit-bottling, from start to finish, containing directions for the making of fruit preserve in the home on either a large or a small scale. After a useful introductory chapter by Mr. G. Cadogan Rothery and a few general remarks by the authoress herself, the book describes the boiling shed and its fittings, the storeroom, and stoves and boiling

pans. Peeling, coring, and stoning machines are next dealt with, and the vacuum process of sealing is described, together with sterlising appliances useful in connection therewith. Recipes for a good cement for sealing bottles and an ink for bottle labels bring this section of the book to a close. Chapter III. deals with the selection of fruits, with particular reference to gooseberries (English), currants, raspberries, strawberries, cherries, apricots, peaches, plums, greengages, apples and pears; whilst the treatment of fruit—when and how to gather, clean, and grade, how to treat different kinds of fruits—forms the subject of the next chapter. In this chapter also whole fruit conserves are discussed, as also fine, medium and ordinary jams, jellies, etc. Chapter V. is wholly taken up with a discussion on sugar—cane and beet sugars, the appearance of pure sugar, tests, etc. In the next two chapters we have recipes for different fruits, including specialities, such as marmalades, jellies and fruit pastes. Storing and packing, and marketing form the subjects of the final chapters of the book.

We can recommend this book to midland and up-country Natal farmers, as well as, to some extent to coast farmers, although the only Natal coast fruits dealt with are citrus fruits. The book will be found to contain many useful hints, and to those who are engaged in jam-making on anything like an appreciable scale the book will be invaluable.

DAIRY WORK.

"SUCCESSFUL DAIRY WORK." By A. T. Matthews, Market Reporter to the Board of Agriculture. Illustrated. London: Rebman, Ltd., 129, Shaftesbury Avenue, W.C. 1909. 2s. 6d. net.

"Of all foods, milk is the most important, because it is almost indispensable to the growing child, the invalid and the aged, and invaluable to the robust worker. It is a perfect food for all but the active worker, possessing the various constituents for sustaining life and for the growth of the young. But of all foods it is the most susceptible to many influences, some of which may render it unfit for human consumption and even a positive danger to health. Milk, in fact, is very easily contaminated, and, to be at its best, it must be derived from a healthy cow, that has been properly fed and kept under hygenic conditions. Strict cleanliness, from the milker's pail to the consumer's jug, is absolutely necessary, otherwise the milk will turn sour and become a breeding medium for innumerable bacteria. Thus concisely and yet comprehensively does Mr. G. Cadogan Rothery, in the course of an interesting introductory chapter, sum up the problem of milk supply—the problem that every modern dairyman places before himself, and the problem that Mr. A. T. Matthews, in his book, "Successful Dairy Work,"

sets out to solve. From the drawing of the milk from the cow down to the regulation of the milk trade by law, he tackles the whole subject in a thoroughly practical manner, dealing in turn with the planning and construction of dairies, the manipulation of milk, the manufacture of milk products, adulteration and preservatives, costs and profits, organisation of the milk trade, milk legislation, etc.

The book is characterised by a conciseness and clearness of expression that will appeal to the busy man who wants to get at the facts and has not the time to devote to the perusal of ponderous volumes in which what he wants to know occupies a relatively small place. At the same time, Mr. Matthews has not "scamped" his work, dealing as fully as is requisite for the needs of the class of reader for which the book is intended—that is to say, the practical man.

We can recommend the book as a useful one to those of our farmers who are interested in the subject of dairying and milk supply.

ESTATE MANAGEMENT.

Small Estate Management. The Estate Agents' Guide to Building and Management of Estates, Small Holdings, Cottages, etc. By Albert C, Freeman, M.S.A. Illustrated. London: Rebman, Ltd., 129, Shaftesbury Avenue, W.C. 1909. 2s. 6d. net.

This is a book which is primarily intended for estate agents, but there are others who will find much in it of value. The work comprises discussions on the management of estates and the duties of an estate surveyor, the Small Holdings Act of 1907, and the provision of homesteads, the planning and construction of farm and other buildings, the construction and arrangemnet of dairies, and the working of small holdings. Chapters III. and IV., dealing respectively with the construction of farm buildings generally and dairies, will be found of value by farmers, as full plans and suggested measurements are given which should prove very useful. The bulk of the book is, of course, of more interest to the English than to the South African reader, but there is much in it that will be found interesting and useful by people living in this country.

Some people think sour milk is not good for poultry. Milk in any form, sweet, sour, or butter milk, is good and largely takes the place of meat.

Among the Farmers.

THE ASSOCIATIONS DURING THE MONTH.

*** *The attention of secretaries of agricultural societies and similar bodies is drawn to this section of the* Journal, *which has for its object the publication of reports of farmers' meetings, annual reports, presidential addresses, etc.; and it is hoped that full use will be made of the facilities here offered for the dissemination of news regarding such doings of the many associations all over the Colony as are likely to prove of general interest to readers of the* Journal. *In forwarding copies of presidents' reports, etc., correspondents are respectfully requested to make sure that they give the date of the meeting on the occasion of which the address was delivered or report read.*

WEENEN.

THE Weenen Agricultural Society held their annual general meeting on the 21st August. The President of the Society, Mr. Allan Stuart, occupied the chair, and among those present were the Hon H D Winter, M.L.A., Mr J W Moor, M.L.A., Mr A F Henderson, C.M.G., Colonel D W Mackay, Messrs E B Griffin, J.P., H Blaker, J.P., J Ralfe, J.P., W Ralfe, J.P., J Rencken, J.P., C Hair, R H Ralfe, F F Churchill, M.L.A., J H K Miller H H Borlase, J Williams, S Bennett, E Hodgson, Dr J B Brewitt, Dr Gordon Cummings, C Ralfe, W Ballantyne, R Ralfe, G M Steere, S Vaughan, F C Robinson, H Vaughan Norton, A B Koe, F C Schiever (hon treasurer), and E Cautherly (hon secretary).

TREASURER'S REPORT.

The minutes of the last meeting having been read and confirmed, the Treasurer submitted his report, as follows:—

"Mr. President and Gentlemen,—I have pleasure in presenting you my report for the year. The statement of revenue and expenditure before you shows a balance of £82 15s. 3d. to your favour with the Standard Bank. Taking into consideration the general depression in the country, and the fact that we had neither the grant from the Government, nor any revenue out of stock sales—two very important items of revenue in ordinary years—the result is a fair one. I should not have been in the fortunate position to show this balance had it not been for Mr. Robt. Ralfe, sen., who again undertook the arduous task of collecting funds for your Society in Durban and Maritzburg. He brought the handsome amount of £146 19s. 6d., and in addition a great number of value prizes. Local donations and subscriptions were, I am sorry to

say, far behind last year, they being as follow:—Donations: 1908, £122 7s. 6d.; 1909, £65 6s. 6d. Subscriptions: 1908, £223 10s.; 1909, £161 9s. 6d. Totals: 1908, £345 17s. 6d.; 1909, £226 16s.—a shortfall of £119 1s. 6d. The reason for this is not far to seek. You have on the general committee alone 22 men behindhand with their contributions, to say nothing about the other regular subscribers who have not paid up. The lack of interest displayed by members lately in the affairs of the Society is most deplorable. At meeting after meeting your secretary has had the greatest difficulty in getting a quorum, to enable him to get on with the business of the Society. This state of affairs is not very encouraging to your officers.

"*Hall Revenue.*—This shows a substantial increase, amounting to £160 6s. 11d. for the year, against £105 15s. 3d. last year, and was the largest amount collected for rent in any twelve months since the hall was opened. I believe you might in the near future look forward to the place being self-supporting, if it were not for the exorbitant rates your Society has to pay on a building from which the public of Estcourt derives all the benefit.

"*Shows.*—The annual show was all that could be expected in these times, and was, with all functions in connection with it—*i.e.*, smoking concert and county ball—financially and socially a success. Unfortunately, I cannot say the same in regard to the horticultural shows. These shows do not get the support from the public that they deserve, and certainly the unfavourable weather on both occasions this last year is answerable for a good deal; but it appears to me that this is not the only reason responsible for the failures. As your Treasurer, and much against my wish—as I am greatly interested in horticulture myself—I must advise you to abandon these shows for the future, unless this next season brings a vast increase in exhibits, and a very much larger attendance on show days. The items on the opposite side of the statement before you are the usual ones, and hardly require going into.

"Having done with the figures on the balance-sheet before you, it is my duty to remind you that nothing has been done in regard to the bond over your property. No effort whatsoever has been made to pay off, or even reduce, this bond. A committee of three was appointed at the annual meeting last year to inquire into the matter, but nothing came of it. After that the Secretary called a meeting, in July, of the Executive and Finance Committees, to consider the question, with the result that the usual three turned up, besides your officers. Before I conclude my report I wish to impress upon you, gentlemen, that it is absolutely essential that something should be done in regard to this matter. The bond of £2,500 falls due again in November, 1910, and the members of the Society are in honour bound to relieve as much as possible those men who were generous enough to become guarantors for

this amount. I appeal to every member of the Society, and to every man in Weenen County who has the welfare of the Weenen Agricultural Society at heart, to see that this liability is done away with. Then, and only then, will your Society go ahead."

PRESIDENT'S REPORT.

The report of the delegates to the Conference of the Natal Agricultural Union (Messrs. J. H. K. Miller and H. Blaker) was submitted; and the President (Mr. Allan Stuart) then read his annual report, as follows:—

"Gentlemen,—I have much pleasure in presenting to you the forty-fourth annual report of the Weenen Agricultural Society.

The Show.

"In doing so, I regret having to report that an unfortunate outbreak of East Coast Fever in the north-western portion of this county, in March last, rather seriously affected the prospects of our show, as some of the members thought that the show ought to be abandoned. A meeting was, therefore, called in May to decide the point, and a resolution was carried that we should hold our show as usual. The show was therefore held on June 24th, and, although not coming up to the standard of previous years, it could not be called a failure.

"*Horses.*—These came forward in about the same number as last year, and the quality was quite up to last year's standard.

"*Sheep.*—There was a slight falling off in the number of sheep, but quality was well maintained.

"*Goats.*—Only three entries came forward, and they were all the property of one exhibitor; they were, however, very nice animals.

"*Pigs.*—There was a good show of pigs, and both in number and quality were equal to any other show in the Colony.

"*Poultry.*—There was a fair show, and a number of good and useful birds were exhibited.

"*Cereals* were quite up to the last year's show both in quality and number of entries, more especially in the mealie class was this part of our show good. The two special prizes presented by Mr. T. L. Fyvie for mealies on cob, and Kafir corn on head, having a large number of entries, must have given a good deal of trouble in forming a decision. Mealies in the country this season, if not a record crop, must be quite equal to any previous year, but even this crop must not be taken as all this county can do in the way of producing mealies, as we were unfortunate in having a spell of drought in the month of December, which was responsible for a shortfall of at least 30 per cent. of our output.

"*Roots.*—In this section we had a fairly good show.

"*Manufactures.*—In this section our show was a failure. I am unable to understand why this was so. We had no good special prize

offered, but even the Soceity's prizes were not filled up. After the fine display of jams and preserves made by the ladies of this county in 1908, it was most disheartening to me to see our hall almost empty in 1909. I trust that the ladies, for the good name of our county, will not allow this to occur again.

"*Implements.*—In this section we had the best display of farming implements that has ever been exhibited at our show before, and I must here thank Messrs. Malcomess & Company and Messrs. G. North & Sons for the trouble and expense they went to in filling up our yard with good and useful implements. Mr. Cosmo Moor offered a handsome prize for Natives to put a Hornsby single furrow plough together. The Natives came forward in numbers to compete for the prize, and one Native completed his work in thirty-six minutes. This, I think, would have been good work even for a tradesman. I must thank Mr. Moor for the kind thought in offering the prize.

"*Extra Exhibits.*—I must thank all those who put on extra exhibits at considerable trouble and expense. Messrs. A. F. Brokensha & Co., goods made from South African wool. Messrs. W. H. Griffin & Co., Quibell's dips. Mr. H. Rohde, English made implements. Johannesdals Timber Co., Ltd., iron gates and models of buildings. Mr. I. T. R. Reade, goods manufactured from mealies and mabele. Considerable interest was taken in an extra exhibit of mealies grown at Bray Hill, having been fertilised by Weenen phosphates. Farmers who saw these mealies must, I think, admit that the discoveries near Weenen of large quantities of phosphate rock are most valuable to the county of Weenen, and, I may add, for the whole Colony. It is also gratifying to know that it is a syndicate of Weenen County gentlemen who have taken up this industry, and are willing to give their money and their time to prove its value. I wish them all the success they deserve. There was another Weenen County industry also worthy of exhibit, but it was too late for insertion in our catalogue. A trolley, a four-wheeled spider, and a two-wheeled buggy, made by Mr. Walter Ballantyne at Mooi River. They appeared to be good value for the money asked for them.

Horticultural Show.

"We held our rose show on October 30th, but through bad weather and want of support it was not a success. I think the incoming committee will be well advised to abandon this show. Our midsummer flower show was held on February 11th. Bad weather was also greatly against this show, and, although not quite a failure, could not be called a success. I think the show could be made much more popular if the incoming committee could get three or four ladies on to their committee, and also add to their prize list some industrial work for girls of a certain age, such as plain needlework, fancy work, crochet, canvas, or ribbon work, also some domestic work such as pastry, cakes, sweets, etc.

Death of Mr. J. H. Wallace.

"It is with extreme sorrow that I have to record the death of one of our fellow members in the decease of Mr. John H. Wallace. Mr. Wallace, a colonist of many years' residence in this Colony, came out as one of the contractor engineers to build our railway from Durban to Ladysmith, and became well known in the Colony when doing this work. Upon completion of the contract he bought the farm "Cliffdale," in this county, and settled down as a progressive farmer. He was once returned to the Legislative Assembly for Weenen County, and held the office of Minister of Lands and Works under the Government of the late Hon. Harry Escombe. Nature had been kind in endowing Mr. Wallace with the gift of eloquence and a ready wit. Having had the advantage of a professional education, he stood head and shoulders above the ordinary farmer of this Colony. Mrs. Wallace, I am quite sure, has the sympathy of this Society in her irreparable loss.

Advisory Boards and E.C. Fever.

"Advisory Boards are still in office in most districts of the Colony. Some districts, however, have refused to re-elect any Boards, holding that, as the Minister has withdrawn most of their authority, they are of very little value in their districts. While willing to admit that some Boards have been careless and made mistakes, there was no justification for the strong language used by the Minister of Agriculture at the Agricultural Union Conference against Advisory Boards. As a whole, the men who are now controlling the movement of slaughter cattle are no more infallable than were the Advisory Boards. Unfortunately for this county, an outbreak of East Coast Fever occurred in March last in the north-west portion of the county. At first it was feared that a large portion of the county would be infected, but this does not appear to be borne out. By recent events I would suggest that a public meeting of all cattle owners in the county be held at an early date, and not only to ask, but demand, that this outbreak be stamped out, and express their willingness to pay a tax on all cattle in the county to defray expenses for guarding this district.

Miscellaneous.

"Our delegates to the Agricultural Union Conference were Messrs. H. Blaker and J. H. K. Miller. Their report has not yet been laid before you.

"Our Hon. Treasurer's report will have shown you that financially the Society is in a sound condition. For this I have to thank all those gentlemen who have given donations towards our funds. Amongst them are Messrs. Randles Bros., of Glen Lynden, two gentlemen who appear to take a keen interest in the affairs of this county.

"The Society is also largely indebted to Mr. Robert Ralfe, sen., who again went to Durban and Maritzburg and collected a large sum of money and a number of prizes in value for the Society. I thank all those merchants, professional men, and tradesmen who so liberally subscribed, and I must also thank all the residents of Estcourt who subscribed to our funds.

"On the evening of our show we held a most successful smoking concert, when a large number of valuable special prizes were offered for the 1910 show. If East Coast Fever can be cleared out of the county, a good show is assured.

"Our hall and grounds are in fairly good order and condition, wear and tear excepted.

Industries.

"Indigenous industries of South Africa, those closely connected with the soil, have made great advance of late years, especially in maize and other cereals also. The farming of ostriches, sheep, cattle, and varied articles of commerce obtained from these animals in Weenen County, and I may say the same all over the Colony. Agricultural conditions are undergoing constant improvement, the class of animals becoming better year by year, while the flocks are rapidly increasing in number. It is also worthy to note that more care is taken in the production, collection, and marketing of all produce—especially wool, feathers, mealies, fruit, and tobacco, and higher prices are being obtained as a reward for extra pains.

"There is evidence that all Natal articles for export are being more and more appreciated in the world's markets, and that increased care and attention is bringing its own reward. Mealies especially have found favour, and buyers from overseas are turning seriously to Natal for their future supplies, and express nothing but praise for the class of articles which have lately been shipped. As a Society I feel that we ought to express our appreciation for the assistance which was given by the Government in the matter of railway rates, and to the shipping companies in reducing the sea freights, which have so materially facilitated the export of mealies oversea. The result of this has been so satisfactory to the producer in opening up new markets that the prices of mealies in this country has been raised, and has further demonstrated that a larger market could be found for the products of this country.

"I hope that the experiments, having given such satisfactory results, will encourage the Government and shipping companies to arrange freight for other products on such terms as will increase the productions of all exportable produce and materials.

THE SOCIETY'S HALL.

"Urgency must be my excuse for again referring to the bond on our hall, and to impress upon the members of the Society the necessity

of something being done to reduce the amount, or to pay off this bond altogether.

"At our last annual meeting a small committee was appointed to make inquiries and suggest some schemes by which this bond could be taken over by the members of the Society themselves, but no report has been received from that committee.

"During the last year the revenue of our hall has largely increased, and the hall will, I am sure, in the near future, be a source of income to the Society, instead of the burden it has been in the past.

"We are on the eve of Union with the other Colonies, and, in my opinion, under the Union the possibilities of Natal are enormous. We ought therefore to see that our hall and showyard are kept up to date, and be ready for prosperity when it comes.

"Our Curator still continues to take keen interest in our hall and grounds, and I think it must be noticeable to members that our hall is in a more cleanly state to-day than it was sometime in the past.

Judges and Stewards.

"I sincerely thank all those gentlemen who so kindly came forward and helped the Society as judges and stewards. Our yard steward, Mr. A. L. Clouson, at show time was unable to attend, and the duties were undertaken by Mr. H. G. Wheeler, who carried out the work quite to my satisfaction, and I feel sure to the satisfaction of every member of the Society.

"It now remains to me to thank all the elected officers of the Society, who one and all have worked hard to make the year a success, and have made my year of office a pleasure to me."

Officers for the forthcoming year were then elected.

In connection with next year's show, it was decided, provided the assistance of the ladies be secured, that a bazaar be held to raise funds towards reducing the debt on the hall, and the following committee was appointed to deal with the matter:—President, Treasurer, Hon. Secretary, Messrs A F Henderson, C.M.G., J W Moor, M.L.A., R H Ralfe, Hon H D Winter, M.L.A., Dr Brewitt, and Dr Gordon Cumming.

A vote of thanks to the chair terminated the meeting.

MALTON

The annual meeting of the Malton Farmers' Association was held at Malton on 31st August, when the President (Mr. C. L. Lund) delivered the following address:—

PRESIDENTIAL ADDRESS.

"It is with very great pleasure that I have the honour of again reviewing the work done by the Malton Farmers' Association and by the farmers of this district during the past year. To review the work done

by the Association will not take up many minutes, for it is greatly to be regretted that, apart from appointing delegates to attend the annual meeting of the Agricultural Union, this Association has done very little, and it seems a pity that more is not done, but in this respect this Association appears to be very much on a par with similar Associations throughout the Colony. But, although this Association has been in a more or less moribund condition, it is very gratifying to be able to report that the work of the members on their farms has been carried on with so much energy and ability that the crops produced this season have eclipsed all previous records, good as some of these records have been, and as fairly remunerative prices have ruled for this district's staple product (mealies), and also for wattle bark, we may saftely conclude that the Colony's exchequer will receive substantial contributions through the medium of the Income Tax.

"During the coming year, although these contributions will be considerably reduced through the large expenses that have been incurred by every member of this Association in having to purchase mules and donkeys to substitute our former excellent draught animals, the trek oxen, I am afraid that when the ploughing season comes round, and we are anxious to hustle, and get on as quickly as possible with planting operations, we will find these mules and donkeys but poor substitutes for the reliable trex ox who has done so much in the past for the development of this district, and not only for this district, but for the whole of South Africa. However, let us hope, and I think that we safely may, that we will have to endure these substitutes for only a few years, when we may again get back to using the best of all draught animals in South Africa—the trek ox.

"The export of mealies appears to have been somewhat checked, not by the inability of the farmer to produce, for it would appear that the farmers throughout South Africa have made such effective efforts at producing, assisted by a plentiful and seasonable rainfall, that they have produced so much that the arrangements made for exporting have been totally inadequate. It is, however, very much to be regretted that many farmers have been so grasping, and altogether blind to their own interests, that they have sent forward mealies that were too wet for export, thereby hampering and interfering with the facility of the export arrangements.

"It is, however, not the Natal farmers that are the principal offenders in this respect, but the mealie-growers of the Orange River Colony and the Transvaal, and as mealies in those Colonies are so much later in coming to maturity, and remain free from weevils for a much longer time than do the mealies in all the best mealie-growing districts of Natal, I think it would be a wise thing if the N.G.R. were to refuse to carry mealies from those Colonies before, say, about the beginning of

August, thereby ensuring the mealies being perfectly dry. In this connection, it cannot be too seriously impressed upon all farmers to see that all mealies sent by them for export are perfectly dry and in sound condition, and to make the maintaining of Natal's good name for maize in the European markets their first consideration, for depend upon it, if we lose this export trade, we will very soon again have mealies being sold in Natal at prices that will be far from profitable.

"There is one thing that everyone who has Natal's best interests at heart cannot view without some misgivings, and that is the fact that numbers of Natal's best Colonists are leaving this Colony and going North, and to other parts of Africa. This fact is the more disconcerting when one considers the enormous amount of land that we have in Natal that is either not cultivated at all or only cultivated in a crude and primitive fashion, consequently only yielding a small percentage of what it ought to yield. It seems, therefore, a great pity that we should be losing the very men who are best fitted to develop this undeveloped mine of wealth. One scarcely knows who or what to blame for this state of affairs. It cannot be because the Government has no sympathy with the agricultural interests of the country, for surely if ever a country had a Government in sympathy with its farming interests, that country is Natal, and in proof of this one has only to consider the enormous amount of money that has been spent by the State on irrigation schemes, which schemes, however, are unfortunately absolutely unproductive, and the still larger amounts that have been spent on Experimental Farms throughout the Colony, which give a return which is not at all in keeping with the money expended on their establishment and maintenance. All these go to prove at any rate that the Government try to do what it considers best for its agriculturists, and yet these agriculturists are the very men that are leaving us. I think the chief reason why this undesirable exodus is taking place is because individuals and companies own large tracts of land which yield good dividends to the owners in the shape of Kafir rents.

"The recently enacted law impsoing a tax on all lands not beneficially occupied by Europeans ought to do a great deal towards remedying this state of affairs. Another thing that is driving people out of the country is the demon tick, and it is somewhat humiliating to think that such an insignificant thing should have such an effect, and it behoves us to do all we can to eradicate this pest from our Colony. Although we very much regret Natal's loss sustained through the migration of many of our best farmers, we cannot but think that such migration will be for the ultimate advantage of United South Africa, in so far as these men with practical up-to-date and progressive ideas are bound to have an educational effect in the districts to which they are going, which will be far and away greater than the establishing of any number of experimental farms.

"*East Coast Fever.*—Since our last annual meeing this terrible disease has continued to spread to such an alarming extent that to-day there is scarcely a farm in our district where it has not made its unwelcome appearance. The spread of this disease has taken place in spite of all our efforts to check it. Fencing, dipping, spraying, isolating, and all other means adopted in the hope of checking the disease have all alike failed. This forces one to the unpleasant and unwilling conclusion that in a tick-infected district like our own it is almost futile attempting to save our cattle. At the same time I do not agree with those who advocate the removal of all restrictions, for I think this would be a most suicidal policy, for, although the restrictions imposed have not had the desired effect in many parts of the Colony, it cannot be denied that there are many parts of the Colony that are to-day free from the disease that would certainly not be enjoying this immunity were it not for the rigid enforcement of the East Coast Fever restrictions; and, furthermore, there is not doubt that so far no other means have been discovered whereby the disease can be fought against with such good results. It would appear that we are as far off as ever from obtaining a cure for this fell disease. Notwithstanding the professors and laymen who from time to time have come forward with reputed cures. It is a great mercy that this disease moves only slowly upon its first entering a herd, as the owner of cattle has thus an opportunity of disposing of all uninfected animals for slaughter, and for the life of me I cannot understand why farmers should so adversely criticise the Government for making arrangements whereby they (the farmers have an opportunity of minimising their loss to a very great extent.

"The wattle industry continues to prosper, and those responsible for its introduction and establishment are deserving of all credit, for I think I am right in saying that this is one industry that has had no sort of assistance whatever from Government, but has, on the other hand, been of considerable assistance to the Colony's finances in providing considerable traffic for the railways, and further in paying full and profitable rates on all bark carried.

"During the past year several disastrous fires have occurred in different wattle plantations, bringing loss and disappointment to the owners and emphasizing the great necessity of every possible precaution being taken to guard against fires; but when all precautions have been taken it is almost impossible to eliminate all risk of danger by fire. One would think that here would be an opening for some enterprising fire insurance company.

"The fruit industry does not appear to receive much attention from residents in this district, and I do not think that anyone can be blamed for not devoting much time to an industry which, even in the most favoured localities, does not appear to recoup those engaged in it to any-

thing like the same extent as do several other industries, and those who are disposed to venture capital and labour in the production of fruit would, I think, be well advised to try some other industry for their main attention. The export of fruit from Natal this season does not appear to have been attended with very much success, notwithstanding the fact that the Government Entomologist—a capable and trained expert—has devoted much time and labour in giving instructions as to packing, etc.

"A discovery has been made, and an industry started, at Weenen, which promises to be of incalculable benefit to all engaged in agriculture in Natal, but in the adjoining Colonies, and if all that is claimed for the Weenen Phosphates is justified we may congratulate ourselves that we have in Natal something that is of more value to the country than a gold mine. We might all of us, I think, give these phosphates a trial and so satisfy ourselves as to their merits, and here I might offer a suggestion whereby this Association might be of advantage to its members, and that is that we send our united orders through this Association, for by so doing, and ordering a large quantity of stuff, we might get it at a reduced rate.

"When travelling about the country it is very gratifying to observe the evidences of progress and enterprise that are to be met with on many farms. It is now, I am proud to say, quite a common thing in our district to see either steam or oil engines doing the work that was previously done by oxen and other draught animals. In fact, not only doing this work, but being used to do work that formerly was not done at all on the farms. This may in some measure account for the falling away of the miller's trade. For mealies, instead of being transported great distances to the mills and being brought back equally great distances in the shape of meal and other manufactured stuff, are now prepared on the farm for local consumption, which must undoubtedly effect a very great saving in every way for the farmer, and it must be very gratifying to him to thus reap the reward of his energy and enterprise.

"During the past year Native labour in this district has been sufficient for all requirements, and in this respect I think we are very fortunate.

"Now, gentlemen, I must conclude my remarks by thanking you for your attendance here to-day, and also by thanking your Secretary for the able manner in which he has discharged the duties of his office. I would like, however, to take this opportunity of welcoming to our district our old and esteemed friend, Rev. J. Scott. I am sure you will all agree with me that he will be an acquisition to the district, and possibly he may, by his energy and enthusiasm in all things pertaining to agriculture, inspire a little more life and energy into our Farmers' Asosciation."

NEW HANOVER.

The annual general meeting of the New Hanover Agricultural Association was held at the Agricultural Hall, New Hanover, on Wednesday, 15th September, 1909, at 10 a.m.

The minutes of special general meeting held on 19th April, 1909, were read and confirmed.

The President's report for the year was read and adopted. It was as follows:—

"The Association is now in its sixteenth year, and there are at present 80 members on the roll.

"During the past year two special general meetings and various committee meetings were held.

"The agenda of the Natal Agricultural Union was the chief business dealt with at the special general meetings.

"*Show.*—The usual steps were taken to make arrangements to hold a Show in July. A special fund was opened to provide for the payment of prizes and the incidental expenses of the Show. It was found, however, that the fund was not being subscribed to in a measure sufficient to meet the purpose for which it was opened, owing, no doubt, to a considerable extent to the losses suffered by farmers through East Coast Fever. It became clear that if the Show were held, it would be necessary to draw upon the general funds of the Association to meet the payments that would require to be made. The Show committee, after carefully considering the situation, decided that, under the circumstances, it would not be wise to proceed further with the arrangements for the Show, more especially as the sum owing by the Association on bond over the hall and grounds amounted to £475, and the Show committee accordingly took the responsibility of abandoning the Show.

"I am sure that you will feel that the action of the Show committee was a prudent and proper on in the circumstances, and that you will approve of it.

"*Bond.*—When the Show was abandoned the general committee sat and decided to reduce the bond by a payment of £125 from the general funds of the Association, which payment of £125 in reduction of the bond was accordingly made, so that at the present date the bond stands at £350.

"*Our Hall.*—During the year, the general committee of our Association authorised an expenditure of not more than ten pounds on repairs to the hall. The hall committee very efficiently framed a specification of the work to be done, and saw it carried out. The hall is now much improved.

"*East Coast Fever.*—Our division is now pretty well honeycombed with the disease, though there are some farms still clean. It is our duty

to do our utmost to prevent cattle from infected farms being brought on to, or driven through, clean farms.

"*Wattles* are doing well, and the price is favourably sustained. Owing to the late autumn rains most farmers were able to strip all through the year.

"*Mealies.*—The past season's crop has been a good one, and it is gratifying to know that the quality of Natal mealies has enabled them to maintain their deservedly high reputation in the European market. It is in our best interests, that no pains should be spared to make certain that the high standard of quality is preserved.

"The Natal Agricultural Union has done good work during the past year. The report of the proceedings of the annual Conference held in April last, issued by the Union in printed form, is an interesting and valuable document, showing, as it does, the ideas and views of farmers in all parts of the Colony.

"I thank the office-bearers and members of the Association for the assistance they have given me in carrying out my duties during the past year.

"In conclusion, I think I may safely say that it is the earnest desire of all of us that the new era now dawning in South Africa will bring genuine happiness and true prosperity to all."

The Treasurer's report showed that, after paying £125 in reduction of the bond over the Association's property, and after paying £10 2s. for repairs to the hall, and all other expenses of the year, a credit balance of £34 8s. 11d. remained with which to commence the ensuing year.

It was moved by the Rev. James Scott, seconded by Mr. Jno. Christie Watt, and carried unanimously, "That the office-bearers who held office during the past year be, and are hereby, re-elected for the ensuing year."

DRONK VLEI.

An ordinary meeting was held at Creighton on the 13th September, when there was a moderate attendance. The President was in the chair, and, in the unavoidable absence of the Secretary, Mr. A. Hodson, his duties were undertaken by Mr. E. Marriott

A strongly-worded resolution, drawing the attention of the Minister to the necessity of enforcing the inclosure of unfenced farms, and pointing out the remissness of Advisory Committees in this regard, was carried unanimously

It was notified that the Government Wool Expert would visit the district some time in November, and give a demonstration of the correct method of classing and packing wool at Mondi.

Some dissatisfaction was expressed at the decision of the Natal

Agricultural Union to increase the subscription payable by affiliated association, as the sum now demanded would absorb more than one-third of the revenue of the Association.

Correspondence *re* the charge of one penny per 100 lbs. for goods and one shilling per head for live stock loaded or off-loaded at Mondi Siding was read and discussed. The meeting considered the action of the Railway Department in thus trying to cover the cost of the siding, which, under better conditions would bring increased traffic to the line, most unjustifiable; especially when taken in conjunction with the high rates charged between Mondi and Creighton.

The question of the management of the cemetery was brought up for discussion, but it was decided to refer it to a public meeting.

UPPER BIGGARSBERG.

The President of the Upper Biggarsberg Farmers' Association read the following report at the annual meeting of the Association, which was held on the 24th September:—

"Gentlemen,—In presenting the ninth annual report of this Association I regret to again have to record a season more or less disastrous to the majority of its members. Owing to the abnormal rainfall experienced during the whole summer both the mealie and potato crops were in many instances failures, and there appears to be little doubt that the majority of the farms in this district are able to withstand drought better than excessive rains.

"The stock farmer has also had his share of ill-fortune, the percentage of deaths in herds of cattle being considerably above the average, owing, so far as my information serves, to the great increase in quanity of ticks, which is surely an efficient reason to induce the owners to cleanse their cattle either by dipping or spraying them. Sheep also have had a bad time of it, bluetongue accounting for many deaths, and wireworms have also had a longer period than usual in which to devastate the flocks.

"I have now inoculated merino sheep with anti-bluetongue vaccine for the last three years, and have always had satisfactory results.

"The position with regard to East Coast Fever is practically the same as it was one and two years ago. During the early part of the year all movement of cattle other than slaughter cattle was prohibited, and the power of issuing permits previously exercised by the Advisory Boards was cancelled by the Minister of Agriculture and relegated solely to the Veterinary Department.

"So far as is known the district is still clear of the disease, but it is a constant menance, and the cattle-owner will be wise who provides

as many paddocks as possible in which to temperature and move his cattle should an outbreak occur among them.

"Considerable difficulty is being experienced in getting produce to the railway, and the cost of transport has considerably increased the debit side of the year's expenses. So far as I am aware the Government transport has not been used in this part of the district, and one gets the impression, whether correct or not, that it is not really intended that it should be available except at prohibitive rates.

"Mr. Langley and your President attended the meeting of the Agricultural Union in April, and your resolutions, with one exception, were carried by large majorities.

"At the same time they had an interview with the Minister of Agriculture and urged him to open the district for the months of May, August and September to ox transport, but without success. Your President interviewed the General Manager of Railways when he was at Dannhauser and stated the need that existed for a better local service of trains. Since that interview the service has been infinitely worse, and few farmers use the railway to travel on if they can avoid it. An agricultural show was held at Newcastle in June which sadly lacked support from the farming community, and this district was, I believe, solely represented by a few sheep. It is to be hoped that the next show held there will see a considerable quantity of produce exhibited from this district.

"The business done by the Association during the past year has been practically nil. An endeavour was made to hold a stock sale in December, but proved a failure owing to the impossibility of offering cattle.

"No tenders were called for fertilisers or grain bags, as there appeared to be no desire on the part of members that such should be done, the reason being probably that many are members also of the Natal Mealie Growers' Union and made their purchases through it, and also that the principal firms dealing in fertilisers send their representatives through the district, who are keen in booking orders from the individual farmers.

"I believe it is owing to the above conditions that interest in the Association has to some extent been lacking during the past year, and I trust the incoming office-bearers will conceive the advisability of again undertaking this branch of its usefulness, and also endeavour to get members to realise that it is only by co-operation that a community can progress. In conclusion, I thank our hon secretary for his work during the year and those members of the Association who have attended the meetings, and I trust they will continue their support to the Association during the coming year."

Epizootic Lymphangitis.

By W. M. Power,
Chief, Veterinary Division.

This disease, though known for a long time in other countries, did not gain entrance into South Africa until the Boer War. Cases have since been met with in all the Colonies; in fact, towards the end of the campaign it was fairly prevalent in many parts of the country, though in Natal it has until recently been almost entirely confined to the North Coast, where on some of the sugar estates it has now unfortunately obtained a firm foothold. As far as we know, the disease only affects equines, *viz.*, horses, mules and donkeys. It is a very virulent disease, due to the presence of a specific organism, and characterised by a discharge of pus (matter) from the lymphatic vessels of the skin and those underneath it.

The symptoms are usually found on the skin, closely resembling Glanders (Farcy) and may be observed almost on any part of the body, but they are most frequently met with on those parts which are most exposed to injuries from kicks, harness galls, etc., and are as a rule at first noticed as small sores or ulcers (one or more) on the legs, shoulders, neck, ribs, etc. The sore appears in its early stages as a bud or pimple; it then burts and discharges a yellowish pus. Other sores may make their appearance near the first one, and frequently appear to be arranged in line, this being due to the fact that the infection follows the course of the lymphatic vessels.

In advanced cases these sores or ulcers may become very numerous, and in the hind limbs they may extend from the fetlock to the groin, apparently covering the whole of the inside of the leg; there may or may not be a discharge from the nostrils. In mild cases there is no systemic disturbance, the animal apparently being quite healthy except for the presence of a few ulcers on the skin. It is unfortunate that such should be the case, as very often, where the owner or the driver has had no previous experience of the disease, the ulcer does not arouse suspicion, but is treated as an ordinary slight wound, the animal is continued to be worked with the rest of the span, and in this way the disease may be spread from one animal to another by direct contact, or by the harness, stable utensils, whip, etc. As mentioned above Epizootic Lymphangitis closely resembles Glanders, but it may be distinguished from it by certain symptoms and microscopical examination of the smears prepared

from the pus of the ulcers, and also if necessary by the application of the Mallein test.

With regard to treatment, I may say that some cases are curable if proper treatment is adopted in the early stages, and then only if the primary lesion is not situated near a joint or in close proximity to any important blood vessel. To be successful complete excision of all the diseased tissue must be carried out, and it is most essential that the after treatment of the wounds be attended to in the most thorough manner, that is, by the application of suitable dressings, and constant examination, in order to ascertain if any further infection is present at or near the seat of operation. It frequently happens that the lesion may have apparently been successfully dealt with, and the wound heals, but after an interval—which may extend to many months—ulcers appear near the original lesion or on some other part of the body, so it will be understood that if every particle of diseased tissue is not removed the infection remains as a source of danger to other animals, and may also be carried in the lymphatic stream to other parts of the body.

The fact that although a case may be apparently successfully dealt with by operation, etc., and still retain infection in the body to develop the disease at a later date (many months afterwards), certainly weakens the system of attempting to eradicate the disease by surgical means. Owing to the long period of incubation, which may be anything up to twelve months, special caution is required in regard to in-contact animals; such precautions include systematic inspection and quarantine, and should any lesions be observed, no matter how small, the animal should be isolated until a definite diagnosis can be made. In order to prevent the spread of infection, rigid disinfection of premises, harness and anything that has been in contact with the animal must be carried out; even whips, hands and clothing of assistants should receive attention. In some cases, such as badly constructed, old wood and iron stables, it is necessary to destroy the buildings in order to ensure thorough disinfection.

It will be seen that the eradication of the disease in a country like this and with a limited staff is not an easy one if undertaken by attempting treatment of the affected animals, and I am therefore of opinion that the most economical means of dealing with the disease is to destroy all the clinical cases, quarantining and systematic inspection of all the in-contact animals with a thorough disinfection of the premises, etc. We have authority under the Epizootic Lymphangitis Act to deal with the disease in this manner, and at present all clinical cases are being destroyed, and the quarantining and inspection of in-contact animals is being carried out as efficiently as possible in Natal, and I hope we shall be able to make the same arrangements for Zululand at an early date, as

several outbreaks have recently occurred in this Province as well as in Natal.

I regret I have been unable to obtain some good photographs of animals suffering from the disease, as I wished to have them published in the *Journal* with this article, but I hope it will be possible to obtain some in time for the next number. The frontispiece in the present issue, however, will give some idea of the appearance of the disease, although the case depicted is an advanced case.

Correspondence.

ENQUIRY *RE* PIPE CALABASHES

An East Griqualand correspondent writes asking if there is any sale in Natal for pipe calabashes. Should any of our readers desire to get into communication with our correspondent we shall be glad to furnish his name and address.

BARBERRY TALLOW.

TO THE EDITOR OF THE "AGRICULTURAL JOURNAL."

SIR,—We would esteem it a favour if you will kindly let us know where Barberry Tallow is obtainable. This tallow is not konwn in Dundee as far as we can gather.—Yours, etc.,

HONEYWILL & TAYLOR.

Glencoe Junction.

The only time when it's proper to be a dead man is when the undertaker comes to try on your new harness.

In terms of No. 2 (*a*) of the Regulations made under Ordinance No. 4, 1853, and published under Proclamation No. 58, 1903, the Indhloveni Forest, bounded southward by Lot A 104 and otherwise by Lot FP 269, in extent 76 acres, in the Polela district, having been surveyed, has been declared to be a demarcated forest within the meaning of the regulations in question. A plan of this forest is now lying in the office of the Director of the Division of Agriculture and Forestry, Cedara.

THE FARMER BOYS' PAGES.

MONTHLY ARTICLES, NOTES AND PARAGRAPHS ON ELEMENTARY AGRICULTURAL SUBJECTS

FOR

BEGINNERS IN AGRICULTURE AND STUDENTS GENERALLY.

Conducted by "ARATOR."

*** *Correspondence, whether in the form of notes, comments, or inquiries, is invited from readers, and letters of general interest will be published and replied to in these pages. All communications should be addressed to* "ARATOR," C.o. Editor, "Natal Agricultural Journal," Maritzburg.

"Arator" to His Friends.

THIS month I have three inquiries to answer in these pages, and I am glad that readers have made a start. I hope these will be followed by a number every month. My first letter is from a correspondent at Makowe Mission Station, in Zululand, who writes me as follows:—"Dear Sir,—I am glad to notice the new 'Farmer Boys' Pages' in the *Agricultural Journal*, for on this station I have a lot of farm work to do and as yet have had no experience on a farm, and shall be most glad of your help from time to time. There is a lot of ground here where sweet potatoes have been raised and the ground neglected after, so that it is full of small potatoes and tops. What is the best way to bring this ground into good condition again? We have no manure, only having donkeys on the place. Could you give any advice on the best way of growing sweet potatoes? I shall take great interest in the 'Farmer Boys' Pages.'"

* * *

In answer to my correspondent's question regarding the clearing of ground where sweet potatoes have been grown and which ground has been neglected, the easiest way is, if you have any pigs, to turn them on to the ground; they will be about the best means of clearing it. If that cannot be done, then plough the land as deep as you can, and after that cultivate it as thoroughly as possible. Then plant a crop of beans or roots—in fact, any crop that is usually planted in drills;—then with frequent hoeings the sweet potatoes can be kept in check and finally

eradicated—which could not be done if an ordinary broadcast crop were planted.

* * *

My next letter comes from the O.R.C. "V.G.B.," who has a question to ask with regard to the instalment of lightning rods, writes:—"I was very much pleased to see you had started the PAGES, which I much appreciate. They are very interesting and to the point. You invited anyone who might want something explaining to write to you, and I am now taking advantage of your kind offer. The question is not so much to do with farming as it is to do with the safety of farmers. I refer to lightning rods. Can you tell me about them? We have put up a long piece of twisted wires (two) on the top of which is a foot or so of copper wire also twisted. The galvanised wire has been led down the wall and in a trench some distance away. Will it be at all effective? One side of the house has a hip roof. I don't think the way the other side has been done will act on the hip roof, because some of the wire will have to be brought down the roof iron; will the lightning be more likely to run down the wire or go into the iron? It will be attracted by the copper piece, will come down and then some will go down the galvanised wire and some into the roof. Is that correct? If it is, some other method must be devised. If suitable conductors cannot be constructed at home, we must, of course buy some. I hope you can understand the difficulty of the hip-roof. My idea is that the electricity would just as soon go into the roof-iron as travel down the wire. If the wire was copper, then it would prefer going down that, wouldn't it?"

* * *

"V.G.B." touches on a matter that is rather out of my line, but I think I can answer his question satisfactorily. You must understand that the earth is a large storehouse of electricity, and that, during a thunderstorm, the electricity that is in the air seeks to connect up with the electricity in the earth. This it is able to do more rapidly through the pointed prominences on the surface of the earth, such as trees, houses, posts, riders on horseback, and even through umbrella sticks, as well as through many other similar agents. Of course, whatever the electric fluid passes through, unless it be of metal, it tends to destroy, either partially or wholly. Now, to save brick houses from destruction by lightning, what are termed lightning conductors are, as you know, made use of, and they are used for this reason, that metal is a better conductor of electricity than any other material, and consequently the destructive current, which is received by means of the brush or point at the top end of a lightning conductor passes down through the *conductor* to the earth rather than through the building itself. According to your letter, you are doubtful as to whether the electricity will go down the iron roof of your house instead of runing down the wire. You

must, however, remember that the roof is situated on brick or stone walls, but in any case the wire serves as a quick direct communication with the earth, and the current will by preference pass through that wire rather than running all over the roof and through the walls of the house, whether they are of brick or galvanised iron. Of course copper is a better conductor of electricity than iron, but iron wire will do quite well enough.

* * *

"Amateur," writing from Bremersdorp, asks: "Is it possible to know how far we can drive nails or staples into trees, or even hang a gate, without doing them damage, or killing them."—You must realise that nothing in nature stands still, and more especially so trees, so that a gate hung in the way you suggest would be a very strange fit after one growing season. It would take a very large number of nails to kill a tree, but of course the practice of driving nails into growing trees is inadvisable from a timber point of view. How far a nail, or staple, may be driven into a tree depends, of course, on how large the tree is. If the tree is of a good size, moderate length nails will not kill it or do it any damage, except, as I have said, that the timber value of the tree will be lessened thereby.

* * *

I hope that next month I shall have still more letters to deal with, for I want readers to make free use of these PAGES for inquiries, as well as for interchange of ideas and experiences, comments and so forth. If you have any trouble, if there is any particular point in the articles appearing in these PAGES about which you are not clear, or if you want anything explained, write to me, and I will do my best to help you.

* * *

Address your letter to "ARATOR," care of Editor, *Natal Agricultural Journal,* Maritzburg.

Implements of the Farm.

III.—CULTIVATORS AND HARROWS.

IT would be impossible in a series of short articles such as these to give anything like a detailed account of all the different types of implements that are now turned out in each class, and accordingly I do not intend to do more than give a general idea of each class of implement—ploughs, cultivators, harrows, and so on—in order that readers may have a fairly good idea of the general principles upon which the implements of each class, taking them more or less as a whole, are designed. This plan I was obliged to content myself with following in discussing ploughs, and I shall proceed on the same lines in discussing, in the present articles,

the next branch of our subject, cultivators, and in succeeding articles the various other classes of farm implements. The descriptions which I give in this way will be sufficient to enable readers of these PAGES to follow intelligently and appreciatively the series of articles on farm machinery on the Natal market which the Editor of the *Journal* is now preparing. These articles will be well illustrated and will embrace practically all the different makes of all the various classes of farm machinery obtainable in Natal.

CULTIVATORS.

The cultivator and the harrow both work on the principle of the ordinary garden rake; the harrow is, in fact, a rake on a large scale, but the cultivator is really more perfect in its action, since it stirs the soil to a greater depth. Indeed land is sometimes prepared by means of the cultivator without using the plough at all. For instance, many farmers consider its use in this way preferable in the case of land off which turnips have been eaten (*e.g.*, by sheep) and on which it is desired to sow barley. The sheep, of course, leave a considerable amount of manure on the land, and by using the cultivator instead of ploughing the land for barley crop the manure remains near the surface of the soil. Also, in the use of steam power, the cultivator is held by some to be preferable to the plough in breaking up stubble.

In order that the ordinary use of the cultivator may be understood, it may be said that this implement takes the place of the hoe. What is called the "horse hoe" belongs, in fact, to the cultivating class of implements. All the various implements designed for cultivating—that is for loosening the surface soil for the purposes of destroying weeds, admitting air into the soil, and retarding the evaporation of the moisture in the soil by providing a "mulch," as it is called, of loose earth—are constructed upon the same general principle. A number of teeth, called "tines," are uniformly arranged and fastened to a frame which is carried on one or more wheels; and as the implement is drawn along the rows of growing plants, the points of the tines are dragged through the soil between the rows at a depth of a few inches. The tines are furthermore so arranged as to loosen the soil over the whole surface, and they are made in different shapes to meet the varying requierments of the work.

Cultivators are made of all sizes, and can be had for loosening one row at a time or for dealing with a number of rows. There are also cultivators made for various special crops. We also see various forms of harrows used for cultivating purposes. The ordinary tooth harrows can, of course, only be used whilst the plants are very young, otherwise, in dragging the implement over them, damage would be done to the crop. The disc harrow, however, in one of its forms, is often used for lucerne, after it has been cut; but in this case the implement is used

not so much for cultivating (although it does accomplish this to some extent) as for splitting the cut stalks of the plants for the purpose of promoting greater growth.

HARROWS.

The word "harrow" is derived from the Old English *hyrwe*, "to tear up." Strictly speaking, cultivators should be called harrows also, if we are to follow the meaning of the Old English word.

The harrow, as I have said, is, in its best known, ordinary form, but a rake on a large scale drawn by animals; and its purposes are to pulverise the surface of the land after ploughing, to clean land that has been ploughed or cultivated by bringing weeds to the surface, and to cover the seed after it has been sown. The teeth or tines are regularly arranged, and in such a way that each tooth cuts a fresh track of its own, no two tines following the same track. The tines are fixed to frames, in rows (usually there are five rows and about twelve tines in each row), and are hitched on to a long bar and dragged over the ground without any wheels.

In the ordinary harrow the teeth drag perpendicular to the surface of the ground. There are other harrows, however, in which the tines are placed at an angle, the ends pointing in the direction in which the implement is travelling; and some again have tines very much after the same style as some forms of cultivator tines. Other harrows again not only have cultivator tines, but are also mounted on wheels—as instance Howard's self-lifting wheel harrows and Clay's improved drag harrows on wheels. Another form of harrow is that known as the Norwegian, which, instead of having immovable teeth, is constructed with three rows of revolving star-teeth—that is to say, each tine-piece consists of a "star" of four, five, six, or seven teeth, which revolve as the implement moves. The machine is mounted on wheels and in the improved forms the elevation and depression of the tines is controlled by a lever. This type of harrow carries us naturally on to the disc harrow. Here, instead of revolving star-shaped tine-pieces, we have revolving discs. These discs are usually concave in shape, but in some makes they are flat. The discs are in two sets, which can be placed at any desired angle in relation to each other for working. As the discs revolve they lift the earth, and even, to some extent, invert the soil to the depth they cut. They are useful labour-saving implements and work very efficiently. For clay soils the discs are made with sections cut out at intervals around their circumference, in order to prevent the soil from clogging, as it would do in the case of the solid discs.

The chain harrow is a variation of the ordinary tooth harrow, which we may notice in passing. This form of harrow is very little used—if used at all—in this country. It is only serviceable for surface action, such as for lightly covering seeds or for spreading manure on grass land.

A Chat about the Soil.

III.—THE PHYSICS OF THE SOIL.

Now we come to learn something of the Physics of the Soil—that is to say of the sizes of the particles of the soil, porosity, texture, tenacity, retentiveness, weight, odour, colour, movement of soil moisture, temperature, and so on. We have got an idea of what the soil is, how it was formed, etc., and we have now to study the relation between the character of the soil—using the word in its broadest sense—and farming. We will begin with a consideration of the size of the particles of which the soil is composed.

Upon the question of the size of the particles of a soil depend many characteristics, such as texture, tenacity, absorptive power, and so on; and besides this, the average size of the particles which go to make up a soil has much to do with the quality of the crops grown. Some interesting discoveries in this connection have been made of late years by American investigators. According to Primrose McConnell, who quotes some of the figures given by American scientists an ordinary class soil is estimated to contain 400,000,000,000 particles per ounce, while a good maize soil has about 280,000,000,000 particles. It is stated that soils with 250,000,000,000 to 300,000,000,000 particles per ounce are adapted for potatoes; 350,000,000,000 to 450,000,000,000 for onions, and so on.

Generally speaking, the finer the particles of a soil are, the greater will be its fertility; and the reason for this is the simple fact that, where the soil is fine, the roots of a plant will come in contact with more of it than if the particles are larger. At the same time, the finer a soil is, the more does it need frequent cultivation, in order to allow air to enter and to allow the roots to spread more readily.

Some soils we hear described as porous; others are spoken of as dense. The degree of porosity of a soil is dependent upon the sizes of the particles that go to make up that soil—not on the sum of the spaces between the particles. For example, we learn that clay has a pore space of about 50 per cent. (judging from the amount of water this kind of soil will hold), while a coarse sand may have a pore space of only 25 per cent., yet sand is more porous than clay because it allows water to percolate through it more readily than does a clayey soil, the individual spaces between the particles being larger in the former than in the case of the latter.

Soil texture is another matter that calls for discussion. The texture of a soil is very closely connected with the proportion of "proximate constituents" (sand, clay, lime, humus, stones, etc.), present. For instance, an open texture in the soil is due to the presence of a large

proportion of gravel or sand, while closeness of texture is due to a relatively large proportion of clay. An open soil does not hold water well and has little tenacity, but it is easy to cultivate; while on the other hand a close soil is difficult to till, is tenacious, and allows water to percolate very slowly.

Soil that is composed of more than half clay will be very tough. In dry weather it will be liable to set hard and crack, and when an attempt is made to till it, it will be cloddy and lumpy. Soil that has too great a proportion of clay should have lime added to it, which will make it crumbly and friable and so easier to cultivate.

The texture of a soil may be greatly improved by dressings of farmyard manure (which, of course, besides enriches the soil from a fertilising point of view); whilst another good plan is to "green manure"—*i.e.*, grow a forage crop like soy beans, cowpeas, rape, mustard, and so on (articles on this subject will appear in these PAGES in due course) and plough them under in the green state. This mass of vegetable matter decomposes, becoming humus in time and so doing much good.

The action of frost, however, for the temporary improvement of soil texture, takes a lot of beating. When land is to lie fallow during the winter it is greatly improved by ploughing it in the late autumn and leaving it thus for the disintegrating action of the frosts of winter. The frost freezes the particles of moisture in the clods of soil, and the consequent expansion of the moisture serves to break up the soil, so that, by the time the spring comes, the ground is greatly improved as regards tilth and is easy to bring into condition for seed sowing.

Soils are often spoken of as "light" or "heavy." These terms have nothing whatever to do with the actual weight of the soil, but refer to the degree of tenacity that the soil possesses. A sandy soil, for instance, is called "light," and this is because such a soil is easily cultivated: the draught necessary for ploughing is relatively *light*. A clay soil, on the other hand, requires *heavy* draught power, and so is spoken of as "heavy." The tenacity of a soil is, of course, its degree of stickiness: the more sticky a soil is the heavier it is to work. There is a surprising difference in the tenacity of soils. Some require as much as five times the power required to pull a plough through them at the desired depth that lighter soils need; but, of course, the more a soil is worked the less tenacious it must become.

It should be noted that sandy soil is most tenacious when it is wet and least so when it is in a dry condition; whilst on the other hand a clay soil is least tenacious when it is wet and sets into a hard lump when it is dry. When a clay soil is in a wet condition it is advisable not to cultivate it, on account of its tenacity to "puddle," by which the possible tilth will be destroyed.

(To be continued.)

Agricultural Chemistry for Beginners.

By ARCHIBALD PEARCE.

CHAPTER II.

HAVING somewhat cleared the ground, we shall now proceed to describe two of the elements named, selecting Oxygen and Hydrogen first, because they enter into the composition of so many other substances, and in describing them we shall pave the way for the understanding of certain important classes of their compounds.

OXYGEN.

Oxygen is a gas which is so widely found in Nature that in the free or uncombined state and in its compounds it forms about half the entire weight of the world. The air we breathe consists chiefly of a mixture (not a compound) of oxygen and another gas called nitrogen, the former making up about one-fifth of the total volume; eight-ninths of water by weight is oxygen; and it forms a greater or lesser part of the majority of the rocks of which the earth is composed. It is a very active element, combining readily with most other elements, and the compond formed when oxygen unites with another element is called an *oxide* of that element. Thus the oxygen of the air combines with iron, forming iron oxide, which we know by the name of rust; oxygen and phosphorus form phosphoric oxide; oxygen and calcium, calcium oxide or lime; oxygen and hydrogen, hydrogen oxide, which is water. It is the oxygen of the air that enables things to burn; the burning of a candle, for instance, is in fact the combination of the oxygen of the air with the carbon and hydrogen of the grease. The various oxides are of great importance, and some of them will be referred to later on.

HYDROGEN.

This element is another gas, and the lightest of known substances, being fifteen times as light as air. The next time we want to make "killed spirits" for soldering, let use put the pieces of zinc and spirits of salt into a wide mouthed bottle (not too large), and cover the mouth loosely with a piece of paper. After the effervescence has proceeded for a few minutes, apply a light to the mouth, and we shall either get quite a loud pop, or a bluish, almost invisible, flame will burn at the mouth of the bottle. The gas which causes the effervescence is hydrogen; if it has completely filled the bottle it will burn quietly, if it is still mixed with air it will explode. In both cases the application of flame has caused the hydrogen to combine with the oxygen of the air and form water, which is, as explained above, the oxide of hydrogen.

ACIDS AND BASES.

We shall now be in a position to understand the constitution of a large and important class of compounds termed acids. These are distinguished by a sour taste like vinegar or lemon-juice, by the power of reddening paper dyed blue with litmus (a colouring matter extracted from certain kinds of lichen), and *by always containing hydrogen that can be replaced by metals.* For instance, sulphuric acid consists of hydrogen, sulphur, and oxygen; if the hydrogen is expelled and its place taken by iron, so that the new compound contains iron, sulphur and oxygen, we get what is called a *salt* of iron and sulphuric acid, to which the name of iron sulphate is given, and all compounds of metals derived in this way from sulphuric acid are called sulphates of those metals. Similarly, nitric acid contains hydrogen, nitrogen and oxygen; if the hydrogen is replaced by the metal sodium we get sodium nitrate (nitrate of soda), and all such derivatives of nitric acid are called nitrates. In the same way, from phosphoric acid we obtain salts called phosphates: from carbonic acid, carbonates; from silicic acid, silicates; and from muriatic acid, muriates: the latter acid is, however, now more properly known as hydrochloric acid, and its salts as chlorides. It differs from the other acids named in containing no oxygen. When we were preparing our soldering fluid just now, what really happened was this: the metal zinc turned out the hydogen from the spirits of salt (which is the popular name of hydrochloric acid) and took its place, forming the salt of zinc and hydrochloric acid, namely, zinc chloride, thus:

We had at first—

Hydrochloric acid and *Zinc*

composed of

hydrogen, chlorine } and zinc.

What was left was

Zinc chloride and *Hydrogen.*

composed of

zinc, chlorine } and hydrogen.

It is plain that one acid can form a number of different salts, according as the hydrogen is replaced by various metals.

Most acids are formed by the combination of certain oxides with water; thus sulphuric acid is the result of an oxide of sulphur combining with water; and such oxides have the name of *acid-forming oxides,* or *anhydrides,* given to them. They are chiefly the oxides of non-metals. Most of the oxides of the metals, on the other hand, do not cause the formation of acids, but if they are brought into contact with

acids they produce salts, identically the same as those formed from the metals themselves. In this case, however, no hydrogen is set free, but it combines with the oxygen of the oxide instead, forming water. This will perhaps be clearer if we illustrate the reaction which occurs when iron oxide acts upon sulphuric acid with the consequent formation of sulphate of iron.

Before reaction we have—

Sulphuric acid and *Iron oxide*

hydrogen, sulphur, oxygen } and { iron, oxygen

After reaction we get

Iron sulphate and *Water*

iron, sulphur, oxygen } and { hydrogen, oxygen

Oxides of this kind are called *basic oxides* or *bases*. When so brought into contact with acids they *neutralise* them; that is, prevent them having any action on litmus paper, which is the usual test for the presence of an acid. This is expressed by saying that most salts are neutral to litmus; this rule, however, has a good many exceptions.

Below are a few simple questions on the foregoing, to enable anyone to test his grasp of the subject so far.

1. The ancients used to call earth, air, fire, and water the four elements. Were they right in so doing?

2. What are the chemical names of water, lime, spirits of salt, iron rust?

3. What weight of oxygen is contained in 36 lbs. of water? How much in 10 cubic feet of air?

4. Explain exactly the connection between an acid and a salt.

5. If calcium oxide were acted on by sulphuric acid, what substances would you expect to be formed?

6. Mention two other names by which hydrochloric acid is known.

7. What is meant by a sulphate?

8. Why is hydrogen sometimes used to fill balloons? If you were asked to make some, how would you proceed?

9. How would you try and find out whether a certain soil was acid or not?

(To be continued.)

Sheep Notes.

IT takes blood to feed sheep ticks, and blood is too costly to be used in this way; dip for ticks regularly without fail.

Take a pride in your flock, and remember that in this, as in other branches of farming, what is worth doing is worth doing well.

Wean the lambs at four to five months old, and give them the freshest pasture on the farm, and keep clean water and salt within their reach.

Choose a ram with a strong head, neck and back; broad chest, strong and well-set legs; a fine, dense and even fleece, and true to the best type of the breed.

Poultry Notes.

A LUSTY crow, an active step, and wide-awake appearance in a cockerel are indications of vitality.

There is only one way to have pullets mature early, and that is to keep them growing.

Board floors in the chicken-house are better than wet ground, but dry ground is best of all.

Chicks are always stronger, and hatches come off better if the hen is absolutely undisturbed while hatching.

Chicks coming from healthy, vigorous parent stock, when surrounded by proper conditions, are bound to grow and mature in fine condition.

Pig Notes.

KEEP the young pigs growing thriftily.

A breeding boar should not be kept fat. This is a very unnecessary condition.

Because pigs are thin and have large frames it does not necessarily follow that they will feed well.

Every check or halt in the growth of a pig through its first two months is more expensive than at any later period.

A sow with a mean, cross disposition is always hard to deal with, and often causes the loss of the litter.

One advantage with dairying in connection with pig raising is the supply of milk that can be had for the growing pigs.

Grit for Fowls.

A fowl kept without grit is in exactly the same position as a man without teeth, and indigestion is inevitable. Now indigestion is one of the primary causes of liver disease in poultry. Furthermore, it will be obvious that if the food swallowed by a fowl is not properly digested, a proportion of the egg-forming constituents contained therein will be wasted; it follows, therefore, that a supply of good hard grit is conducive to increased egg production. Sand is useless as a substitute; it is neither large enough nor hard enough. The proper-sized grit for a full-grown fowl is about the size of a pea, and angular and sharp as possible.—A. RHODES, in the London *Agricultural Gazette*.

Weathering of Soils.

READERS who have been following the articles in these PAGES on Soils will be interested to read the following extract from *The Agricultural News* of Barbadoes, on the rate at which "weathering" takes place:—

From the point of view of soil formation, the rate at which the rocks of the earth are broken down by atmospheric agencies into particles small enough to be classed as soil, that is by weathering, is an important consideration. Observations recently made on the continent of Europe go towards giving an answer to this question. In Austria it was found that in certain ruins, during 500 to 600 years, there had formed from limestone a layer of soil 4 inches thick and containing 4·4 per cent. of humus, while the surrounding natural soil, also resting on limestone, was about 16 inches thick and contained 7·7 per cent. of humus. If this was formed at the same rate as that on the ruins, 2,400 years must have been required for the purpose. Similarly on a fortress wall built of limestone, in the Crimea, the soil accumulation in 600 years was found to be 4 inches thick, while the depth of that on the adjoining land measured 26 inches, so that on the same basis, it should have required 3,900 years for its formation.

The General Manager of Railways announces that, with effect from the 1st January, 1910, the rate for the conveyance of South African wattle bark *in bundles* between N.G.R. stations will be the No. 6 S.A.P. "C" rate, *plus* 10 per cent., subject to a minimum charge of 2d. per 2,000 lbs. per mile.

Coal and Labour Return.

Return of Coal raised and Labour employed at the Natal Collieries for the month of September, 1909:—

COLLIERY.	Average Labour Employed.					Output.	
	Productive Work.			Unproductive Work.	Total.		
	Above Ground.	Below Ground.	Total.			Tons.	Cwt.
Natal Navigation ..	366	639	1,005	21	1 026	27,156	0
Elandslaagte	284	631	915	12	927	15,288	2
South African	131	308	439	50	489	15,044	15
Durban Navigation ..	251	553	804	—	804	14,546	0
Dundee Coal Co. ..	260	503	763	—	763	12,095	6
St. George's ..	214	418	632	—	632	12,089	0
Glencoe (Natal) ..	171	325	496	35	531	10,006	8
Natal Cambrian ..	210	3 4	524	4	528	9 969	15
Talana	116	404	520	15	535	8,430	2
Newcastle	81	395	476	—	476	7,613	6
Natal Steam Coal Co. ..	96	216	312	—	312	6,005	6
Hatting Spruit ..	87	142	229	—	229	4,651	4
Hlobane	91	208	299	20	319	4,401	10
Ramsay	79	136	215	13	228	3,511	5
Ballengei h	67	96	163	23	186	2,185	6
West Lennoxton ..	54	91	145	—	145	1,629	19
Burnside	—	—	—	263	263	59	0
§Vryheid	5	5	10	—	10	35	0
‡Vaalbank	—	8	8	8	16	14	10
Makatees Kop ..	4	—	4	—	4	5	0
Totals	2,567	5,392	7,959	464	8,423	154,736	14
Corresponding month, '08	2,123	4,992	7,115	756	7,871	143,044	6

	Productive Work.			Unproductive Work.	Total, Sept., 1909.	Total, Sept., 1908.
	Above Ground.	Below Ground.	Total.			
Europeans	197	160	357	71	428	381
Natives	901	3,321	4,222	242	4,464	4,440
Indians	1,469	1,911	3,380	151	3,531	3,050

* Cost Charged to Capital Account. § August Return. ‡ Includes August return.

CHAS. J. GRAY,
Mines Department, Maritzburg, 7th October, 1909. Commissioner of Mines.

RETURN OF COAL BUNKERED AND EXPORTED.

Return of Coal bunkered and exported from the Port of Durban for the month of September, 1909:—

	Tons.	Cwt.
Bunker Coal	62,378	4
Coal Exported	35,125	6
Total ..	95,503	10

Customs House, Port Natal,
1st October, 1909.

GEO. MAYSTON,
Collector of Customs.

Meteorological Returns.

Meteorological Observations taken at Govt. Stations for Month of September, 1909.

STATIONS.	TEMPERATURE (IN FAHR. DEGS.).				RAINFALL (IN INCHES).						
	Means for Month.		Maximum for Month.	Minimum for Month.	Total for Month.	No. of Days.	Heaviest rainfall in 1 day.		Total for Year from July 1st, 1909.	Total for same per'd from July 1st, 1908.
	Maximum	Minimum					Fall.	Day.		
Observatory ..	72·7	59·6	97·9	50·6	6·21	16	1·19	2nd	8·13	5·82
Stanger ..	75·5	58·7	102	49	6·85	15	2·09	2nd	8·87	4·05
Verulam ..	76·5	56·5	103	48	5·27	11	1·45	2nd	7·03	4·29
Greytown ..	73·3	45·5	89	33	3·32	13	·85	2nd	4·77	2·77
Newcastle ..	79·9	38·7	90	28	2·23	4	1·20	3rd	3·88	3·85
Mid-Illovo ..	71·3	52·5	95	40	6·33	15	1·26	2nd	7·55	4·30
Estcourt ..	73·1	46·4	89	33	1·27	10	·39	3rd	2·24	2·41
Umbogintwini ..	73·7	53·8	103	45	6·90	17	1·57	3rd	9·03	—
Ixopo ..	—	—	—	—	1·82	10	·89	3rd	5·77	4·13
Imbizana ..	74·3	56·3	96	47	5·59	9	1·61	3rd	6·76	4·89
Port Shepstone ..	77·2	55·0	89	45	5·91	19	1·45	2nd	7·11	6·20
Umzinto ..	85·8	54·5	93	52	7·74	10	1·73	12th	9·13	4·31
Richmond ..	70·8	49·8	90	37	6·00	17	1·39	2nd	6·99	5·77
Maritzburg ..	73·9	50·7	94	37	1·16	17	·97	2nd	5·06	3·84
Howick ..	72·0	48·4	89	35	3·85	13	·86	2nd	4·61	4·17
Ladysmith ..	78·1	49·5	93	37	1·11	8	·42	2nd	3·18	—
Dundee ..	73·7	53·2	88	39	2·00	3	1·54	3rd	4·69	2·57
Weenen Gaol ..	81·8	48·7	93	37	1·10	8	·48	2nd	2·89	2·71
Cam erdown ..	71·4	51·4	98	41	4·63	14	·88	14th	5·67	3·27
Krantzkloof ..	—	—	—	—	6·12	17	1·31	3rd	7·35	3·31
New Hanover ..	75·3	51·2	92	38	3·91	13	1·27	2nd	5·02	5·19
Krantzkop ..	78·5	38·7	89	33	2·61	14	1·15	2nd	4·16	2·50
Lidgetton ..	73·5	41·7	90	26	3·88	15	·98	2nd	4·69	4·27
Nongoma ..	71·1	45·7	89	36	2·19	7	·93	3rd	4·09	—
Vryheid ..	62·1	49·0	88	38	1·17	6	·72	3rd	3·68	4·47
Nqutu ..	72·2	45·3	81	35	2·17	4	1·56	2nd	—	2·76
Mtunzini ..	79·9	55·1	87	50	13·02	20	3·70	2nd	19·68	9·99
Hlabisa ..	76·7	58·4	88	50	5·58	8	1·80	2nd	6·71	5·13
Ubombo ..	70·0	55·3	85	47	2·72	9	·74	3rd	4·67	2·94
Empangeni ..	77·2	56·9	100	48	7·02	10	2·57	2nd	11·22	6·01
Point ..	—	—	—	—	7·66	14	1·85	2nd	10·44	5·05
Nottingham Rd ..	69·5	40·0	88	25	2·06	10	·72	3rd	2·75	—
Charlestown ..	70·9	—	80	—	·11	1	·13	14th	1·92	2·06
'Ngomi Forest ..	69·1	46·8	87	34	5·64	17	1·27	1st	8·21	—
Mahlabatini ..	81·2	46·3	92	35	3·03	8	·78	3rd	4·48	2·68
Bulwer ..	—	—	—	—	3·91	17	·76	12th	4·59	3·10

Meteorological Observations taken at Private Stations for Month of September, 1909.

STATIONS.	TEMPERATURE (IN FAHR. DEGS.)		RAINFALL (IN INCHES).					
	Maximum for Month.	Minimum for Month.	Total for Month.	No. of Days.	Heaviest rainfall in 1 day.		Total for Year from 1st July, 1909.	Total for same period from July 1st, 1908.
					Fall.	Day.		
Adamshurst	92	37	3·61	14	0·91	2nd	4·40	3·01
Hilton	86	35	4·41	17	0·17	24th	5·38	3·75
P.M.B., Botanical Gardens ..	—	—	4·55	17	1·12	2nd	5·40	4·04
Ottawa	—	—	5·74	13	1·32	3rd	7·54	—
Eshowe	—	—	7·75	11	2·58	2nd	—	—
Umhlangeni	—	54	5·41	10	1·65	2nd	7·09	—
Equeefa	85	46	6·37	12	1·29	13th	7·34	3·59
Umzinto, Beneva	—	—	6·24	12	1·45	2nd	7·20	3·07
Elandslaagte	—	—	1·61	5	0·80	2nd	4·15	—
Riet Vlei	—	—	2·20	13	0·60	2nd	2·55	2·85
Cedara—Hill Station	86	37	4·09	18	0·82	3rd	4·85	—
Cedara—Vlei Station	83	37	4·37	20	0·85	3rd	5·45	2·32
Winkel Spruit	103	49	6·94	12	1·74	2nd	8·77	4·33
Weenen	93·5	37	1·37	9	0·37	2nd	2·70	—
Giant's Castle	75·5	44·8	2·55	11	0·43	12th	5·65	4·20

Return of Farms at Present under Licence for Lungsickness and Scab.

STOCK INSPECTOR.	DISTRICT.	DISEASE.	OWNER.	FARM.
A. P. Craw ..	Ladysmith ..	Scab	Mrs. M. J. v d Merwe	Coolfontein
		,,	Natives ..	Roosboom
		,,	Natives ..	Laurie's Kraal
		,,	H. Raath ..	Putteni Spruit
		,,	Natives ..	Goedgedacht
		,,	A. G. Dannhauser	Riet Kuil
		,,	J. C Buys ..	,,
		,,	Natives ..	Blew Bank
		,,	Natives ..	Phoyflaai
		,,	J. Farquhar ..	Stewart Park
		,,	J Hyde ..	Hydeswood
		,,	Natives ..	Kleinfontein
		,,	Natives ..	Roompoort
		,,	H. J. Buys ..	Piets Hoek
		,,	L. J. J. E Bester ..	Pootena's Spruit
		,,	B. J. Nieuabar ..	Tylden
		,,	P. Bartlett ..	Uithol
		,,	R. A. Smith ..	Lombard's Kop
A. B. Koe ..	Portion of Estcourt	,,	G. B Jone ..	Bergveld
		,,	Schlanders Bros. ..	Kelvin
		,,	R. Mattison ..	Calcott
		..	J. W. Moor ..	Greenford
		,,	J. v d Merwe ..	Lands End
A. C. Williams ..	Utrecht ..	,,	Natives ..	Ouverwacht
		,,	P. L. Uys ..	Town Lands
		,,	T. de Jager ..	Tigerkrantz
		..	Natives ..	Riet Vlei
		..	D. Hartman ..	Rooikop
		..	J. de Winnaar ..	,,
		,,	C. Potgieter ..	Nitkomst
		,,	P. Truter ..	Welgevonden
		,,	— Lekhoff ..	Bate Spruit
		,,	Y. Hanbridge ..	Strydfontein
		,,	Natives ..	Vergenoeg
		,,	G. van Vensberg ..	Politiek
		,,	Natives ..	Tamboekieshoek
		,,	,,	Frieschgewaagd
		,,	J. D. Davel ..	Klipfontein
		,,	J. P. Moolman ..	Mooihoek
		,,	J. L. Nel ..	Tamboekieshoek
		,,	N. Fourie ..	Lanerwacht
		..	L. Tante ..	Waterhoek
		,,	C. van Tonder ..	,,
		,,	P. Landman and G. Bezuidenhout ..	,,
		,,	K. Cronje ..	Verbikop
		,,	P. L. Uys ..	Waaihoek
		..	Natives ..	Eersteling
		,,	T J. Botha ..	Sandspruit
		,,	M. J. J. Groenewald	Vaalsloot
		..	P. Groenewald ..	,,
		,,	Natives ..	Roodekoppen
		,,	L. de Jager ..	Waterval
		,,	Natives ..	Quaggasdrif
		,,	G. J. Keel ..	Ventersplaats
		,,	T. Uys ..	Zoetsmelk River
H. Van Rooyen ..	Babanango ..	,,	Natives ..	Verduveld
		,,	,, ..	Wellust
		,,	,, ..	Boutlijst
L. Trenor ..	Alfred ..	,,	Yalwayo ..	Location
		Lungsickness	J. T. Clothier ..	Whitecliff
		,,	Sigumu ..	Lot F
		,,	Mqunansla ..	Omega
		,,	Spingaan ..	Hawarden
		Scab	Incabi ..	Location
		,,	Makerlu ..	,,
		,,	Natives ..	Location No. 1
J. Ralfe ..	Lion's River ..	,,	Arbuthnot, O. C. ..	Gowrie
		..	G. M Trickett ..	Howick Commonage
		,,	Geo. Woodhouse ..	Halliwell
		,,	W. G. Shaw ..	Colbourne
		..	P. Marais ..	Maketeeskop
K Ripley ..	Intonjaneni ..	..	Nkanyezi ..	Groenkop
		..	T. W. Smith ..	Oakdale

RETURN OF FARMS UNDER LICENCE *(Continued)*.

STOCK INSPECTOR.	DISTRICT	DISEASE.	OWNER.	FARM.
K. Ripley ..	Intonjaneni ..	Scab	S. Ferriera ..	Diepkloof
		,,	Natives ..	,,
C. T. Vaughan ..	Paulpietersburg ..	,,	F. D. Wilson ..	Nineve
		,,	Natives ..	Town Lands
		,,	R. Craig ..	Freschgewa gd
		,,	J. B Rudolph ..	B schkrantz
		,,	J. M. van Rooyen ..	Halb rton
		,,	J. Viljoen ..	,,
		,,	C. Webb ..	Paapkuil Vlei
		,,	J. H. Stadler ..	Paardefontein
		,,	Mrs. Stadler ..	Padafontein
		,,	H. Viljoen ..	Roodekopjie
		,,	J. H. Potgieter ..	Lachkraal
		,,	H. Rohrs ..	Altona
R. Wingfield Stratf rd	Newcastle ..	,,	Natives ..	Chevi hek
		,,	J. Dixon ..	Blauwbosch
		,,	Argas & Cod ..	Harte Rivier
		,,	M. J. Oosthuizen ..	Enden Vlei
		,,	T. Lazenby ..	Springbok
		,,	D. Degewaa ..	Balli guch
		,,	C. Kennedy ..	Tennyson
		,,	Natives ..	Dassiepoort
		,,	,, ..	Connigsberg
		,,	Schwikkard & Co ..	Boscobello
		,,	Natives ..	Koppie Alleen
		,,	E J. Dicks ..	Essenwood
		,,	A. M Muller ..	Droogdal
		,,	A. Towile ..	Majuba North
		,,	J. van Rooyen ..	Asvoge skop
		,,	O. S. Vogel ..	Norfolk
		,,	L. P. de Jager ..	Sluiteldraai
		,,	F. R. Muller ..	Leyden
		,,	J. J. Duigenaar ..	Langton
C. E. Walker ..	Portion of Estcourt	,,	Oates, W. E. ..	Oatsdale
		,,	A. Stuart ..	Glen Stuart
		,,	F. H. Kerr ..	Rock Mount
		,,	L. Lloyd ..	Hidcote
		,,	J. W. Haw ..	Woodleigh
		,,	J. Marais Jun. ..	Northcote
		,,	Johnson & Clarke ..	Be gonis
G. Daniell ..	Vryheid ..	,,	Manqulu ..	Hardeetaald
		,,	Mkelegana ..	,,
		,,	Kuyeze ..	Mooiplaat
		,,	Mrs B. Webbe ..	Rustemburg
		,,	C. Beneke ..	Langkrans
		,,	Micah ..	Groenkop
		,,	C. van der Merwe ..	Nooitgedacht
		,,	C. van Rooyen ..	Bloeure dal
		,,	P. Tredoux ..	Weinansrest
		,,	J. H. Lombard ..	D iefontein
		,,	H. A. Lombard ..	,,
		,,	A. W. Meyer ..	Kromellurborg
		,,	A. Jansen ..	Frauimtzicht
		,,	J. H. Combrink ..	Goedhoop
		,,	Natives ..	Goedgedacht
		,,	J. G. Theron ..	Traktaal
		,,	J. F. Potgieter ..	Vaalsloot
		,,	M. Kungmann ..	Vredehof
		,,	Natives ..	Vaalkrans
		,,	J. J. Gregory ..	Weltervreden
		,,	J. J. Nel ..	Beufort
		,,	A. Armstrong ..	Lekkerwater
		,,	H. Beukeus ..	Sterkstroom
		,,	J. Z. Moolman ..	Klipfontein
		,,	F. D. Moolman ..	,,
		,,	G. van der Wenter	Tintasd ift
		,,	H Campbell ..	Town Lands
		,,	Natives ..	Vaalkranz
		,,	A. T. Davel ..	Brackspruit
		,,	H. T. Harris ..	Arcadia
		,,	Natives ..	Tuta's Drift
		,,	B. E. A. Rabe ..	Enyati
		,,	M. T. Ferreira ..	Vaalkrans
		,,	Natives ..	Waterfall
		,,	J. van Rooyen ..	Welkeveden
		,,	J. A. K. van Rooyen	Rust laats
		,,	H. de Bruin ..	Rordepoort
		,,	C. van Rooyen ..	Rooikop
		,,	L. van Rooyen ..	,,

RETURN OF FARMS UNDER LICENCE *(Continued)*.

STOCK INSPECTOR.	DISTRICT.	DISEASE.	OWNER.	FARM.
G. Daniels ..	Vryheid ..	Scab	J. van Rooyen ..	Bedrog
J. R. Cooper ..	Nkandhla & Nqutu	,,	Natives ..	Selutshana
		,,	,, ..	Nquta
		,,	,, ..	Telezi
		,,	C. E. Parr ..	Sandhlwana
		,,	H. Muller ..	Nquta
		,,	Natives ..	Mkonjana
		,,	,, ..	Nondweni
		,,	,, ..	Mafethling
		,,	,, ..	Hlozagazi
		,,	,, ..	Dalana
		,,	,, ..	Mazala
		,,	,, ..	Nqudeni
		,,	,, ..	Gadaleni
		,,	,, ..	Mawoni
		,,	,, ..	Mafethleni
		,,	,, ..	Haladu
		,,	Westbrook Bros. ..	Dalton
E. Varty ..	Western Umvoti ..	,,	D. C. Steel ..	Highfield
		,,	J. A. Graham ..	Driefontein
		,,	H. Hansmeyer ..	Onres
		,,	T. J. Maritz ..	Mt. Alida
		,,	F. R. Nel ..	Vermaak's Kraal
J. F. van Rensburg	Ngotshe ..	,,	Natives ..	Tochygeisnde
		,,	J. D. Bester ..	Smaldeel
		,,	L. Botha ..	Weltervreden
		,,	J. Joubert ..	Kondelaager
J. Stewart ..	Bergville ..	,,	J. W. Scheepers ..	The Steps
		,,	H. Jackson ..	Lytton
		,,	Reid Bros. ..	Klaarfontein
		,,	G. E. Tatham ..	Nertherley
E. W. Larkin ..	Umsinga ..	,,	Oyugnlangans ..	Umsinga
		,,	Tshantulu ..	Umsinga
		,,	Susezulu ..	Umsinga
		,,	Natives ..	Location
		,,	,, ..	Gordon Memorial
		,,	,, ..	Vaalkop
		,,	T. H. Dedekind ..	Harding
		,,	W. W. Strydom ..	Oranje
		,,	Natives ..	Craigmillar
		,,	,, ..	Klippoort
		,,	,, ..	Umsinga
		,,	V. L. Whelar ..	Martens
		,,	Natives ..	Uithoek
		,,	Natives ..	Myonyama
		,,	P. V. Strydom ..	Hill Crest
R. Mayne ..	Eastern Umvoti & Krantzkop	,,	Natives ..	Furleigh
		,,	,, ..	Ematimabolo
		,,	P. and H. Mare ..	Speculation
		,,	W. Havemann ..	Sophiadale
		,,	J. T. Martens ..	Groenkop
		,,	J. M. Zietsman ..	Paul's Rest
		,,	Natives ..	,,
		,,	L. G. Nel ..	Glenboig
		,,	Van Rooyen Bros. ..	Wonderfontein
		,,	P. R. Bester ..	De Rust
		,,	J. A. Nel ..	Dingley Dell
E. W. Bowles ..	Ixopo ..	,,	E. F. Garland ..	Springvale
		,,	E. W. Veley ..	Ayshorpe
		,,	Tshelwana ..	A of S 55
		,,	Bobejana ..	Lot K of 5
A. H. Ball ..	Weenen ..	,,	J. P. Lotter ..	Berg Vleit
		,,	P. H. Van Rooyen ..	Buffels Hoek
		,,	P. P. van Rooyen ..	Doornkloof
		,,	Naude & Lotter ..	Scottshoek
		,,	J. T. van Rooyen ..	Belle Vue
		,,	J. R. van Rensburg	Blinkwater
		,,	J. S. Els ..	Scottsburg
		,,	E. C. Robinson ..	Mona
		,,	S. C van Rooyen	Middelburg
		,,	C. P. F. Lotter ..	Waterfall
		,,	Van der Westhuyzen	Winterhoek
		,,	R J J van Rooyen, Sr	Bird Spruit
		,,	L. J. Fourie ..	Scottspoort
		,,	P. R. Buys ..	Waterfall
		,,	P. H. van Rooyen ..	Buffel's Hoek
		,,	T. C. Lotter ..	Waterfall
		,,	Natives ..	Belle Vue

RETURN OF FARMS UNDER LICENCE *(Continued)*.

STOCK INSPECTOR.	DISTRICT.	DISEASE	OWNER.	FARM.
A. F. Smith (actmg)	City, Umgeni ..	Scab	Umveli ..	Zwaartkop Location
		,,	Dria ..	,,
		,,	Samuel ..	,,
		,,	Jan je ..	,,
		,,	Laduma ..	,,
		,,	E. Taylor ..	Taylor's Station
		,,	Ramen ..	Ellis' Estate
		,,	J Henwood ..	Hilton Road
		,,	B. J. Bodenhorst ..	Kem enveld
A. J. Marshall ..	Du dee ..	,,	H. A. J. Davel ..	Kliprug
		,,	C. T. Vermaak ..	Kalderfontein
		,,	Natives ..	Conterfon
		,,	McKenzie & Kruger	Dabray
		,,	Natives ..	Klipport
		,,	Geo. Kremer ..	Dalry
		,,	Natives ..	B ggersgat
		,,	R. J. Marshall ..	Cleveland
		,,	J. de Jager ..	Waschbank
		,,	Natives ..	Blinkwater
		,,	,, ..	Hartebeestfontein
		,,	,, ..	Goedekens
		,,	,, ..	East Hesterton
		,,	C. M. Meyer, Sen...	Glad tone
		,,	R. J Marshall ..	Woo llands
		,,	J. B. Wade ..	Stanton
		,,	C. J. P. Landman	Iro dale
		,,	Natives ..	Kamelboom Kop
		,,	G. F. Dannhauser..	Cardwell
		,,	H. A. J. Duvel ..	Klipry
		,,	J. H. Hatt ng & Son	Hattingdale
		,,	J. J. Gregory ..	Cotswold
		,,	T. C. Koekemoor ..	Maybole
		,,	N. B. Swarts ..	Rooikop
B. Klusener ..	Lower Umzimkulu	Lungsickness	Nyapu	Berbeck
A. Brown ..	Polela, Underberg.	Scab	H Baikie ..	Inchgarth

Brands Allotted to Infected Magisterial Divisions.

The following is a list of the brands which have been allotted to the several infected Magisterial Divisions:—Durban County, D. 2; Alexandra County, A. 2; Lower Tugela, T. 2; Mapumulo, S. 2; Inanda, B. 2; Umsinga, U. 2; Dundee, X. 2; Vryheid, V. 2; Ngotshe, H. 2; Paulpietersburg, P. 2; Nongoma, G. 2; Mahlabatini, L. 2; Ndwedwe, N. 2; Weenen County, W. 2; Umvoti, F. 2; Hlabisa, K. 2; Eshowe, E. 2; Ladysmith, R. 2; Babanango, O. 2; Ladysmith, East of Line outside infected area, R. 3; Utrecht, Z. 2; Krantzkop, 2 K.; Umvoti Location, 2 F.; Ladysmith, West of main line of Railway, R. 3 on left neck; Pietermaritzburg City, 2 P.; Umlazi Location (Upper Umkomanzi portion), 2 U.; Umgeni Division, west of line, J. 2; Lion's River, east of line, 2 H.

Land and Agricultural Loan Fund.

The Land and Agricultural Loan Fund has now been established, and the Board are prepared to receive applications for advances on security of first mortgage on fixed property. Appilcations must be made upon special printed forms, which can be obtained, together with full particulars as to the conditions under which advances are made, from the office of the Fund, Colonial Offices, Pietermaritzburg.

All Correspondence should be addressed to the Secretary, Land and Agricultural Loan Fund, P.O. Box 357, Pietermaritzburg.

Pound Notices.

NOTIFICATION is contained in the *Government Gazette* of the sale, unless previously released, of the undermentioned live stock on the dates specified :

ON THE 3RD NOVEMBER.

Bulwer—Merino ram, about 10 months old, no brand or ear marks, long tail, probable value, 8s. Impounded on the 16th September by E. D. Stewart, Polela.

Howick—Bay gelding, star on forehead, tail square cut, short, about 14.2, no brands.

Solferino, Gourton—Dark bay mare, rather low in condition ; running at the kraal of Magadeni, in Chief Ndhlumbi's Location, Ntabamhlope : black heifer, ear mark under side of right ear.

ON THE 10TH NOVEMBER.

Greytown - Goat ram, black, yellow points, slit in front of left ear, age about 4 years, probable value, 10s. Impounded on the 15th September by W. Torlage, Holmes Dale.

Solferino, Gourton—Dark bay stallion, branded N.C. on near side hind leg, probable value, £18. Impounded on the 28th September by Mr. L. F. Snyman.

Woodstock, Bergville—White Kafir ram, nick in front and slit in back of right ear, probable value, 7s. 6d. Impounded on the 1st October by Natal Police.

ON THE 17TH NOVEMBER.

Dundee—Mare, dark bay, branded "D" off quarter, long mane and tail ; mare, dark bay, blind right eye, long mane and tail, no brands. Both mares have foaled since admission to the Pound. Bay colt, yearling branded "J" off quarter ; eight Merino sheep and four lambs, sheep branded "S" left side, ear marks various. One of the lambs has a peculiar mark, the left fore-leg being black.

Richmond Black she goat ; two black kids.

Weenen—Running on the farm "Groot Melie uin," and reported by Mr. W. S. W. Harding to be too wild to be driven to Pound : Chestnut filly, about 2 years old, about 12 hands, no brands visible, white star on forehead, right hind foot white.

Woodstock, Bergville Nineteen white Kafir goats.

ON THE 24TH NOVEMBER.

Muden—Bay stallion, about 7 years old, indistinct brand on right thigh, marks of knee-halter on left front leg, star on forehead, about 12 hands high ; dark grey stallion, about 2 years old, 12 hands high, no marks ; dark bay stallion, about 2 years old, 12 hands high, no marks.

ON THE 1ST DECEMBER.

Ingogo—Reported by the Natal Police, Spitzkop, to be running on the farm "Oakley," as being too poor to be driven to the Pound : Two old Merino sheep various earmarks, indistinct brand. These sheep, it is stated, strayed from a flock coming down from the Orange River Colony some time ago, and have been running with different owners' sheep from time to time ever since.

Ladysmith—Black half grown sow, four white feet and white on snout ; white Kapater Angora goat, right ear swallow tail, right ear square taken out of front ; impounded on the 16th October.

Mount Hope, Klip River - Two dark and one chestnut mares ; chestnut mare star on forehead, two white hind fetlocks, about 5 years old ; black mare, fleabitten, two hind fetlocks white, about 6 years old ; black filly, no marks or brands, about one year old.

Pietermaritzburg— Running on the farm "Kingston," and reported by J. F. Potterill as being too wild to be driven to the Pound : Light brown mule mare, branded D.C., white star on forehead, slit off ear.

Vryheid—Two blue and white she goats with three nicks in right ears, and hole in left ear ; brown and white she goat, with three nicks in right, and hole in left ear ; black she goat, with white face, and three nicks in right ear, and hole in left ear ; white she goat, with three nicks in right ear, and hole in left ear ; white he goat, with nick in both ears.

NOTICE.

The Charlestown Local Board intend to establish a "Township Pound" from the 1st November, 1909, and have appointed Mr. T. G. Whittaker as Pound Master from that date.

Government Cold Stores and Abattoirs.

PIETERMARITZBURG.

It is notified for the information of Farmers and others that Government is prepared to receive Cattle at the Government Abattoir, Pietermaritzburg, for Slaughter and Storage, if necessary, upon the following Scale of Rates and Charges, or such of them as may meet the requirements of Cattle owners. It must, however, be understood that owners will be required to make their own arrangements for the sale of the meat of cattle sent in for slaughter, the Government being unable to offer facilities or to accept responsibilities in this regard.

Cattle may also be received for slaughter at the Government Abattoir, Point, Durban, at the charges noted below. As the Government is unable to offer facilities for cold storage at Durban, or for the sale of the meat of cattle sent for slaughter, it must be understood that owners will be required to make their own arrangements in these respects, and the Government is unable to accept responsibility in either regard at Durban.

		Calves up to One Year old.	Cattle over One Year old.	For minimum number of 250 head per month.		For maximum number of 500 head per month.	
				Under 300 lbs. weight.	Over 300 lbs. weight.	Under 300lbs. weight.	Over 300lbs. weight.
		s. d.	s. d.	s. d.	s. d.	s. d.	s. d
1.	Receiving ... ... per head	0 3	0 6	0 6	0 6	0 3	0 3
2.	Killing and Cleaning ... ,,	2 3	3 6	2 9	3 3	2 6	3 0
3.	Labour ... ... ,,	0 3	0 6	0 3	0 6	0 3	0 6
4.	Disinfectants ... ... ,,	0 1	0 1	0 1	0 1	0 1	0 1
5.	Bagging (4 Quarters) ... per body	1 9	3 0	2 6	2 9	2 3	2 6
6.	Cleaning of Tripes ... ... each	0 6	0 6	0 6	0 6	0 6	0 6
7.	Chilling of Beef, up to 72 hours or portion thereof ... ... per body	1 0	2 9	2 0	2 6	1 9	2 6
8.	Chilling of Offal, up to 72 hours or portion thereof ... ... per set	1 0	1 0	1 0	1 0	1 0	1 0
	Chilling and Freezing Beef—						
9	1st week or portion thereof per body	2 0	4 6	3 9	4 0	3 6	3 9
10.	2nd ,, ,, ,, ,,	1 0	4 0	3 3	3 6	3 3	3 3
11.	3rd and remaining weeks or portions thereof ... ,,	0 8	3 0	3 0	3 0	3 0	3 0
	Chilling and Freezing Offal—						
12.	1st week or portion thereof per set	1 4	1 6	1 4	1 4	1 4	1 4
13.	2nd ,, ,, ,, ,,	1 0	1 3	1 0	1 0	1 0	1 0
14.	3rd and remaining weeks or portions thereof ... ,,	0 9	1 0	0 9	0 9	0 9	0 9

A charge of 1s. per head is made in respect of any Sale of Cattle on leg at the Government Abattoir and a similar charge is made in respect of Bodies of Beef or portions thereof.

For further particulars apply to the Manager, Government Cold Stores.

Department of Agriculture, Maritzburg,
21st December, 1908.

Farm Apprentices' Bureau.

LIST OF APPLICANTS.

THE following is a list of the applicants which have so far been received by the Editor of the *Natal Agricultural Journal* from boys desirous of obtaining positions on farms. Farmers wishing to get into communication with any of these applicants should address their enquiries to the office of this journal.

The majority of the applicants have, of course, had no farm experience, but all appear to be strong, healthy and willing.

No. 2.	Age 15.	Has had 18 months' experience of farming. Understands more about forestry than general farming. Speaks Zulu, and understands Dutch.
,, 3.	Age 24.	Colonial born Has a knowledge of bookkeeping.
,, 11.	Age 18.	Has had two years' experience on a sheep farm in the O.R Colony. Is particularly anxious to get back on a farm. Is very willing and obedient.
,, 13.	Age 20.	Is an orphan. Is anxious to learn farming.
,, 14.	Age 16.	Natal born.
,, 15.	Age 19.	Is desirous of learning farming.
,, 25.	Age 23.	Bricklayer by trade. Is anxious to get on a farm.
,, 27.	Age 19.	Has had one year's experience on a farm in the Cape Colony.
,, 30.	Age 18.	Transvaal born Has had experience on a mixed farm. Speaks Dutch and Zulu
,, 34.	Age 18.	Has a slight knowledge of Zulu. Understands carpentry.
,, 35.	Age 21.	Has had five years' experience on farms. Understands cattle and horses and Agriculture. Is anxious to get back on a farm.
,, 39.	Age 19.	Has had twelve months' experience on a fruit farm in the Cape Colony. Speaks Dutch.
,, 40.	Age 24.	Has had a little experience of farm life. Understands bee-keeping. Is anxious to get on a farm.
,, 41.	Age 16.	Has not had any experience. Speaks Zulu. Understands carpentry. Has been engaged in a Solicitor's office for four years. Is very obliging and willing. Anxious to get on a farm.

Epizootic lymphangitis having broken out in Victoria County, a Proclamation has been issued by His Excellency the Administrator declaring the county to be an infected area within the meaning of the Animals Diseases Act of 1894. The removal from that area of any horses, mules or donkeys, whether the same are or are not affected with any disease, is prohibited, except in the case of healthy animals, for the movement of which the written permission of the Chief of the Veterinary Division or of an officer of the Veterinary Department authorised to issue such permits, is necessary. Such permit, moreover, may impose any conditions which the Veterinary Department consider necessary. The penalty for any contravention of this Proclamation is fixed at a fine not exceeding £50, with the alternative of imprisonment, with or without hard labour, until the payment of such fine or for a term of three months .

Employment Bureau.

THE Department of Agriculture has received applications from the undermentioned, who are prepared to become assistants or apprentices on farms. The Department will be glad to hear from farmers willing to take young men as assistants, and to place them in correspondence with the various applicants. Communications should be addressed to the office of this *Journal*.

No. 115.—Englishman, 26 years of age, steady and an abstainer, with a knowledge of cattle and horses, wishes employment on a farm in Natal (English preferred) as a handy man, with a view to furthering his knowledge of farming in this country. Is willing to accept food and clothing in a good home, for services, for a few months with the prospect of a small wage after the first three months.

No. 116.—Cape man, age 32 years; married, no children. Has been used to working with horses and mules all his life. Has good papers from his previous employers, and was in the employ of the Public Works Department for over five years. Is willing to do anything in his power, but cannot read nor write.

No. 117.—Englishman, 25, of good education, desires appointment as overseer on a plantation in Natal, and would pay a reasonable premium and give services free for a few months if necessary. Has had commercial, engineering, surveying and mining experience.

No. 118.—Pensioner from the Army desires to obtain post on a farm. Is particularly fond of gardening. Has excellent discharge papers and good testimonials.

No. 119.—Lady, experienced in dairy work, is desirous of taking charge of a dairy. Has gone through a course of butter and cheese-making, and holds good testimonials from Mr. J. Marshall Douglas, Chairman of the Royal Agricultural Society of England (1905).

No. 121.—Desires open air employment. Age 43. Life experience of agricultural pedigree and prize stock gained in Scotland. Has been six years in South Africa. First-class references and testimonials. Small salary required.

No. 122.—A young man, with life-long experience of cane-growing, desires employployment as manager or overseer on a plantation. Experience has been in Queensland and Fiji. Is good at figures and capable of taking charge of books if necessary.

No. 123.—Married man, 35 years of age, with 5 years' experience on poultry and stock farm in California, wishes to get on to a farm in Natal. His wife is a good cook and handy in dairy. Would be willing to work for a very small wage or for their keep or a period of twelve months at least, after which they would expect some remuneration. Can produce first class personal references.

No. 124.—Practical man, age 35, unmarried, seeks position on any work. Can undertake or attend to any building work and erection of machinery, and has been accustomed to control of coloured labour. Could undertake management of small creamery. Not afraid of work. Has had considerable experience in Agriculture, and can produce highest references.

No. 125.—Single man, age 31 years. Was brought up on a farm in England. Is a tinsmith and plummer by trade, also has a good knowledge of carpentry. Speaks Dutch. Has been in South Africa for ten years.

No. 126.—Colonial, 35 years of age, desires to obtain a position as overseer or manager of an ostrich farm. Has been for some years with first-class farmers, and had charge of some of the best birds in the Cape Colony. Has a practical knowledge of incubating, rearing of chicks, dosing and general management.

No. 127. An expert fruit packer of four years' experience in Spain and France, and twenty years Colonial experience, is open to accept an engagement up to February, 1910. He is open to accept low wages, with board and lodging, and fare to and from the Cape where he is at present.

No. 128.—Wishes to secure employment on a farm. States that he has a genera knowledge of engineering, and has been employed on a large and well-known farm in the Richmond Division.

Farmers requiring good, steady farm hands would do well to communicate with Ensign Anderson, of the Salvation Army Shelter, Maritzburg, who constantly has good men at the Shelter who would be glad of employment at reasonable rates. Ensign Anderson pledges himself not to recommend for employment any but those he is satisfied will give satisfaction to their employers. He will be pleased to enter into correspondence with any farmer who may address him on the subject.

Division of Agriculture and Forestry Notices.

FEES FOR AGRICULTURAL ANALYSIS.

It is hereby notified that Farmers and others can secure analytical determinations from the Government Laboratory, Central Experimental Farm, Cedara, in accordance with the following scale of fees, which is subject to revision :—

	Scale I. £ s. d.	Scale II. £ s. d.
FERTILISERS AND FEEDING STUFFS :		
Determination of 1 constituent	0 7 6	0 5 0
Determination of 2 or 3 constituents	0 15 0	0 10 0
Complete analysis	1 1 0	0 15 0
SOILS : Partial analysis of a soil in relation to its fertility	1 1 0	0 10 6
Complete analysis of a soil	2 2 0	1 1 0
WATER : Irrigation and drainage	1 10 0	0 10 6
VEGETABLE PRODUCE : Fodder, Ensilage, Grain, &c.	1 10 0	0 15 0
MILK, CREAM, BUTTER : Fat only	0 5 0	0 2 6
,, ,, : Complete	0 15 0	0 7 6
WATTLE BARK AND TEA : Tannin	0 5 0	0 2 6
CATTLE DIPS : Quantitative analysis of 1 to 3 principle constituents	0 10 0	0 5 0
INSECTICIDES :		
Qualitative analysis each constituent	0 5 0	0 2 6
Quantitative ,, ,, ,, ...	0 10 3	0 5 0

Scale No. 1 is applicable to samples handed in by merchants and Dealers, and where trade interests are involved.

Scale No. 2 is applicable to samples forwarded by *bona fide* Farmers and Gardeners.

Samples will be accepted at the discretion of the Director, and must be properly selected and labelled.

The Department reserves the right to publish the results of any analysis performed by it ; and, where such is deemed of sufficient public interest, it will remain at the discretion of the Director to remit any charges hereunder.

TREES FOR SALE.

To encourage tree-planting, transplants and seeds of forest trees are supplied by Government, so far as in stock, at the undermentioned rates, exclusive of carriage, from the Government Nursery, Central Experimental Farm, Cedara.

Transplants of Eucalyptus, Pines, Acacias, Casaurinas, Cupressus, etc., about 25 trees in each tin, at 8s. 4d. per 100 trees. Trees in separate tins at 1s. each.

Transplants of scarce kinds, larger trees, or surplus stock, when available, will be charged at special rates, which will be furnished on application.

Tree seeds, in variety, at 6d. per packet. Price per pound, which fluctuates, will be furnished on application.

Package and postage of seed, when required, charged 1s. per lb. extra.

PURCHASE OF TREE SEEDS.

With a view to the encouragement of seed production in the Colony, offers are invited from persons having locally-grown seed of exotic trees for Sale. Not less than one pound will be purchased ; and a specimen bearing seed vessels or flowers should be sent for identification purposes.

SILVER POPLAR.

Root suckers of the Silver Poplar (*Populus alba*) can be supplied in any quantity, at 8s. 4d. per hundred, on application.

POULTRY.

Orders will be received for eggs for sitting of the following breeds for immediate delivery :—Buff Orpingtons, White Leghorns, Silver Wyandottes and Plymouth Rocks,

PERSIAN SHEEP.

An imported Woollen Persian Ram may be hired for the season at a fee of £5, at hirer's risk. Particulars on application. Orders for Haired Persian Rams will be booked for future delivery.

WOOLLED SHEEP.

Offers are invited for young imported Rams being Rambouillet Merinos, Lincolns, Hampshires, Shropshires. Inspection can be arranged to suit intending purchasers.

CORRESPONDENCE.

Communications relating to the following subjects should be addressed in the first place to the officers responsible :—

Admittance of Students to the School of Agriculture.—House Master, Cedara.
Analyses of Soils, Fertilisers, etc.—Analyst, Cedara.
Felling Licenses, Purchase of Timber Sections and Squatters' Holding in Crown Forests.—Chief Forest Officer, Ixopo.
Afforestation, Timber Trees and Seeds.—Chief Afforestation Officer, Cedara.
Agricultural Seeds, Livestock, etc.—Farm Manager, C.X.F., Cedara.
Tropical Plants, Seeds, etc.—Manager, Government Farm, Winkle Spruit.
Agricultural Seeds, etc., for Irrigation Farming.—Curator, Government Station, Weenen.
Fruit.—Orchardist, Cedara.
Accounting Business.—Accounting Clerk, Cedara.
Woolled Sheep, Woolled Classings, &c.—Wool Expert, Cedara.
Apiculture.—Apiarist, Cedara.

E. R. SAWER,
Director, Division Agriculture and Forestry,
Cedara.

Why farming will now pay: because the world's markets are open to you! Place your maize products with the Railway Department and they will dispose of them on your behalf on the European markets! You produce—the Railways will sell! *Result*: A minimum of trouble to you and a maximum of money in return!—*South African Maize Brochure.*

Executives of Farmers' Associations.

*** *The Editor will be obliged if the Secretaries of Farmers' Associations and similar institutions will kindly keep him advised with regard to changes in the* personnel *of their Executives.*

ALEXANDRA AGRICULTURAL AND HORTICULTURAL ASSOCIATION.—President: Wm Thompson. Hon Vice-Presidents: A Blamey, E W Hawksworth, Thos Kirkman, H Basley, J L Knight, R.M. Hon Secretary and Treasurer: Geo Lamb. Hon. Auditor: W B Brunner. Committee: W Arnott, H G Arbuthnot, R C Archibald, R G Archibald, J Bazley, A Behrmann, W Cooke, G J Crookes, R Cruickshank, H D Hawksworth, H E Hawksworth, A F W Hawksworth, R C Hawksworth, J Landers, D McAndrew, F Nelson, C A Preston, Dr. Rouillard, W A Gilbert, Fred Blamey, Rev B M Ford, S C Hawksworth, J C Landers, S F Crookes, J J Crookes, R A Lindsay, J A Curle, F B Preston, R Parkin, H Reynolds, J B Stewart, C Taylor, H H P Waller, J Ross, Rev W C Wilcox, Dr W P Tritton.

ALFRED COUNTY FARMERS' ASSOCIATION.—President: A G Prentice, J.P. Vice-Presidents: C Knox, J.P., L T Trenor, and C A Holwell. Hon. Secretary and Treasurer: H C Hitchins. Committee: C M Etheridge, R Fann, J.P., V Hitchins, S Aitchison, J.P., W B Rethman, Dr Case, J.P., H Rethman, R G Mack, J Hogg.

BOSTON FARMERS' ASSOCIATION.—President: Thos. Fleming, J.P. Vice-President: T. W. Rudland. Hon. Secretary: W. J. Fly, J.P. Hon. Treasurer: H. A. Phipson.

CAMPERDOWN AGRICULTURAL SOCIETY.—President: John Moon, J.P. Vice-Presidents: J Gavin and John W Harvey, J.P. Hon Secretary: W E Allsopp.

CAMPERDOWN DIVISION FARMERS' ASSOCIATION.—President: C J A Scheepers. Vice-President: F N Meyers. Hon Secretary and Treasurer: J Baker. Committee: J Gavin, J W Harvey, J.P., C Baker, J Moon, J.P., H A Meyers, J F Scheepers, J Galtrey, B B Buchanan. Secretary and Treasurer: Jas Baker, P.O., Umlaas Road.

CHARLESTOWN FARMERS' ASSOCIATION.—President: Johannes Vos. Vice-President: — Adendorff. Secretary: W. J. Curnow. Treasurer: J. O. Thomas. Committee: H. O. Eksteen, J. P. Vos, J. C. Uys, W. G. Thomas, D. Doyer, F. A. R. Johnstone, M.L.A., G. E. Lane, S. R. Higgins, B. F. Johnstone, A. J. Johnstone, J. J. Eksteen, R. H. Greaves, Peter Thompson, G. McArthur, and V. B. van Rooyen.

DRONK VLEI FARMERS' ASSOCIATION.—President: Capt A W B Perceval. Vice-President: J H Dalgarno. Hon Secretary and Treasurer: A Hodson Creighton.

DUNDEE AGRICULTURAL SOCIETY.—President: T. P. Smith. Vice-Presidents: The Minister of Agriculture, the Mayor of Dundee, Messrs F Turton, H. Ryley, and A W Smallie. Hon Secretary and Treasurer: J McKenzie. Committee: G M De Waal, B J Humann, R Doidge, H P Walker, T J Williams, W Springorum, H W Walwyn, W J H Muller, D M Meumann, H J Head, C T Vermaak, A L Jansen, J Campbell, H Greenhough, D W H Tandy, A E Norman.

DURBAN AND COAST SOCIETY OF AGRICULTURE AND INDUSTRY.—President: E. W. Evans. Vice-Presidents: Sir B. W. Greenacre, A. M. Campbell, Hon. Marshall Campbell, M.L.C., W. Adams, Frank Stevens, C.M.G., M. S. Evans, M.L.A., P. D. Simmons, W. R. Poynton, Hon. C. G. Smith, M.L.C., G. S. Armstrong, M.L.A., H. R. Bousfield, W. G. Brown, C. Henwood, J. Livingston, John Nicol, C.M.G., H. H. Puntan, R. H. Wisely, V. Seymour, H. Sparks. Secretary: John Morley. Committee: J. Ellis Brown, J. Burman, C. A. L. Bull, D. Doyle, Samuel Deane, James Henderson, W. Konigkramer, W. D. Kimber, W. J. Mirrlees, W Milne, J. Swales, W. J. Thompson, C. Wilson, Wilfred Payne, Wallis Short, S. T. Amos, J. McBride, F. M. Hillier, W. A. Stocken, and W. A. Bath. Treasurer: Edwin Greenacre. Auditor: W. Murray Smith.

DURBAN COUNTY FARMERS' ASSOCIATION.—Patron: J H Colenbrander. President: J McIntosh. Vice-Presidents: H Westermeyer, R R McDonald. Committee: F R W Bœhmer, G Compton, H Freese, W Freese, W Gillitt, H W Kœnigkræmer, H W Nichols, F Schæfermann. Hon Secretary and Treasurer: Frank J Volek.

EMPANGENI AND DISTRICT SUGAR PLANTERS' AND FARMERS' ASSOCIATION.—President: Col. C. B. Addison. Vice-President: P. Stott. Secretary and Treasurer: F. Piccione, P.O. Empangeni. Executive: P. Addison, G. Higgs, — Salveson, — Blake.

ESHOWE DISTRICT FARMERS' ASSOCIATION.—President: J R Pennefather. Vice-President: C F Adams. Secretary: T Parkins. Treasurer: W T Brockwell.

GOURTON FARMERS' ASSOCIATION.—Chairman: M Sandison. Vice-Chairman: R Gray. Hon Secretary and Treasurer: Frederick B Burnard, Highfield P.O. Committee: Dr Landon, J.P., E Reed, J Woods, C van der Merwe.

HATTING SPRUIT FARMERS' ASSOCIATION.—President: A W Smallie. Vice-President: Thos Brookes. Hon Secretary and Treasurer: R J Hearn. Committee: G Queddon, N Glutz, Wm Craig, W R Quested, W T Heslop, Thos Dewar, A E Norman, D P Campbell, J J Grove, H J Hearn, D W H Tandy, J B Pendar, J Campbell, J Barbour.

HIMEVILLE AGRICULTURAL SOCIETY.—President: Henry C Gold, Dartford, Underberg. Vice-Presidents: F E Peto, G H Royston, J B Nicholson. Hon Secretary and Treasurer: G Palframan, Watermead, Underberg. Executive Committee: G Malcolm, W S Johnston, P McKenzie, F E Peto, J S Gordon. Yard Steward: D T Malcolm. Auditors: T C Dearlove and F E Peto.

HOWICK FARMERS' ASSOCIATION. — Chairman: Thos Morton. Vice-Chairman: M A Sutton. Hon Secretary and Treasurer: A Clark.

INGOGO FARMERS' ASSOCIATION.—President: E. W. Noyce. Vice-Presidents: G. A. Fimstone and D. A. Drummond. Hon Secretary and Treasurer: C. Drummond. Committee: W C F Napier, A Paine, A J Garriock, A Wood, J.P., J H Green-Thompson, G H Bishop.

IXOPO AGRICULTURAL SOCIETY.—President: F L Thring, J.P. Vice-Presidents: Col W Arnott, B.M.R., W K Anderson, J.P., C E Hancock, J.P. Committee: John Anderson, Thos Allen, J C Auld, H D Archibald, F S Beningfield, S Boyd, T L Clarence, F E Foxon, R.M., Wm Foster, Jas T Foster, C C Foster, Geo E Francis, L Gray, A M Greer, J.P., J R Greer, Wm Gold, H A Hill, C F Harris, A E Keith, R Kennedy, Geo Martin, W Oakes, L J Phipps, T F Remfry, J W Robinson, Jas Schofield, M.L.A., D C Smail, A Stone, W R Way, A H Walker, M.L.A., P D Webb. Hon Secretary: G C Way, Hon Assistant Secretary: A G Harris. Hon Treasurer: T Arnott.

IXOPO FARMERS' ASSOCIATION.—President: C. E. Hancock, J.P. Vice-Presidents: T. F. Remfry and R. Vause. Hon. Secretary and Treasurer: Geo. E. Francis, Morningview, Ixopo. Delegates to Farmers' Union: Col. Arnott and T. F. Remfrey, with W. D. Campbell as reserve. Committee: John Anderson, W. Oakes, D. Campbell, G. C. Way, James Foster, A. Keith, G. Martin, F. Z. Thring, A. C. Kirkman.

KLIP RIVER AGRICULTURAL SOCIETY.—President: Daniel Bester, Vice-Presidents: Herman Illing, J G Bester, Wm A Illing. Secretary and Treasurer: Edward V Bambrick (Box 90, Ladysmith). Executive Committee: A Brink, J Farquhar, C.M.G., M.L.A., W C Hattingh, J G Hyde, Trev Hyde, A I Horsley, W Freer, L A Leonard, H Nicholson, H C Thornhill, Herman Illing, D Munger, P de Waal, J H Newton, D Sparks, J.P., J T Francis, A W (Gus) Illing, G Pinkney, W Cochrane, George L Coventry, and *ex officio* officers.

KRANTZKOP FARMERS' ASSOCIATION.—President: Capt M Landsberg. Vice President: P R Vermaak. Hon Secretary and Treasurer: G T van Rooyen. Committee: C J van Rooyen (Albany), C J van Rooyen (Wonderfontein), J. A. G. Mare, L M van Rooyen, Jnr, R P Martens, J P Nel, Dr Proksch, and F E van Rooyen.

LION'S RIVER DIVISION AGRICULTURAL SOCIETY.—President: Graham Hutchinson. Vice-President: H Nisbet. Executive Committee: H Nisbet, M A Sutton, A J Holmes, J Humphries, Jno Pole, and W A Lawton. Auditor: W J R Harvard. Hon Secretary and Treasurer: Arthur F Dicks, P.O. Box 1, Howick.

LITTLE TUGELA FARMERS' ASSOCIATION.—President: F van de Waal. Vice-President: F G King. Secretary and Treasurer: H L Frances. Auditor: A D Buchanan. Committee: P R Summersgill, F W Holmes, J P Wepenaar, J J Harding, Max Cameron.

LOTENI FARMERS' ASSOCIATION.—President: J A Tod. Vice-President: T Carter. Hon Secretary: A Kennedy Stone.

LOWER TUGELA DIVISION ASSOCIATION.—President: W R Hindson. Vice-President: A E Foss. Hon Secretary and Treasurer: H Curtis Smith (Stanger). Committee: A S L Hulett, F Addison, G Stewart, T G Colenbrander.

LOWER UMZIMKULU AGRICULTURAL ASSOCIATION.—President: D C Aiken, J.P. Vice-Presidents: H Albers and C H Mitchell, J.P. Hon Secretary and Treasurer: W J Plows. Committee: C Manning, J W Aiken, W G Camp, T F Godwin, J Hutton, H Norden and A Borchard. Hon Secretary, Show Committee: J W Aiken. Show Committee: A E Collison, A Borchard, F Knoop, A Ringo, H F Voigts, J Hutton, C Manning, A J Lugg and H Albers. Hon Auditor: J W Aiken.

MID-ILLOVO FARMERS' CLUB.—Chairman: H S Power, J.P. Vice-Chairman: B B Evans. Hon Secretary: J W V Montgomery. Assistant Hon. Secretary: A L Wingfield. Hon Treasurer: Jos McCullough.

MOOI RIVER FARMERS' ASSOCIATION.—President: R Garland. Vice-President: C B Lloyd. Hon Treasurer: H A Rohde. Collector: Capt W H Stevenson. Auditor: Claude Scott. Hon Secretary: H B Hall.

MUDEN AGRICULTURAL ASSOCIATION.—President: Thos Thresh. Vice-Presidents: Wm Lilje, E A Grantham. Secretary and Treasurer, C A Selling. Committee: Otto Rottcher, Karl Lilje, Karl Rotter, Herman Schafer, Fritz Torlage, T Braithwaite, Ernest Rottcher, C H Tilbrook, Rev H Rottcher (Hon Life Member).

NEWCASTLE.—President: F A R Johnstone, J.P. Vice-President: C Earl. J.P., Mayor of Newcastle; Angus Wood, J.P., Ingogo; O Schwikkard, C.M.G., Newcastle. Secretary: Wm Beardall. Treasurer: Ed Nicols. Executive Committee: L H S Jones, E Phillips, H C Caldecott, C Watson, G Langley, W A Lang, W J P Adendorff, J E de Wet, O Davis, S W Reynolds, B Pettigrew, G W Thomas, G H Bishop, H R Muir, M C Adendorff, W Napier, P Van Breda, Chriss Botha, G Templar.

NEW HANOVER AGRICULTURAL ASSOCIATION.—President: G C Mackenzie. Vice-Presidents: J C Watt, J.P., and R H Oellermann. Life Member: C A S Yonge, M.L.A. Secretary and Treasurer: W D Stewart, New Hanover. Auditor: J H F Hohls. Committee: W N Angus, E Bentley, W W Bentley, Edward Boast, E E Comins, G R Comins, C Crookes, jun, H Dinkelmann, J Duval, W Fortmann, Dr C H Herbert, J Hillermann, J H F Hohls, H Jacobson, H A Light, G C Mackenzie, A F Mackenzie, T M Mackenzie, J Muirhead, J.P., Oswald Muirhead, G Moe, J.P., J Moe, O Moe, C Oellermann, F Oellermann, C J Oellermann, W Ortmann, J C Otto, E Peckham, J.P., J A Potterill, S Peckham, C M Scott, Rev J Scott, Wm Schroeder, J.P., Owen Solomon, J H Smith, Riby Smith, F Thole, H Vorwerk, H F Westbrook, W H Westbrook, C Westbrook, T Wolhuter.

NOODSBERG ROAD AGRICULTURAL ASSOCIATION.—President: Fritz Reiche, J.P. Vice-Presidents: H Mummbrauer, P Rodehorst, W Dralle, W Wortmann. Committee: W Bartels, F Bosse, H Brammer, A J Bruyns, H Bruyns, Carl Dralle, H Gebers, W Gevers, J H Holley, jun, W C Holley, C Hillermann, L Koch, H Kohler, F E Kuhn, M Maister, H Mereis, A Meyer, H Meyer-Estorf, H W Meyer, K A Meyer, H Misselhorn, W Misselhorn, K Peters, I Pfotenhauer, G Rabe, G Reiche, Joh Reiche, W Rencken, H Rosenbrock, H Schmidt, K Schmidt, Rev Jas Scott, K Seele, F J Smith, J Thies, W Witthoft, P Worthmann, A Worthmann, F Worthmann, H Worthmann. Secretary: Paul Vietzen, P.O., Singletree. Hon Treasurer: E Beurlen.

NOTTINGHAM ROAD FARMERS' ASSOCIATION.—President: B. Greene Vice-President: Geo Ross. Secretary and Treasurer: H Singleton, Nottingham Road. Committee: J King, J C Parker, J J Morton, A Pearce, W Wood, C J King, A Mengens, K Soutar, W F Taylor, W A Dales.

PIETERMARITZBURGSCHE BOEREN VEREENIGING.—President: D P Boshoff: Secretary: E G Jansen, 313, Loop Street, Maritzburg.

POLELA AGRICULTURAL AND HORTICULTURAL SOCIETY.—President: J Isbister. Vice-Presidents: W H Allwright, J F Alexander, and H Brown. Hon. Secretary and Treasurer: J Anderson Speak. Auditor: A Brown. Executive Committee: J Isbister, W H Allwright, J F Alexander, H Brown, H J Gazzard, G W Foster, J Anderson Speak. Hall Committee: W H Allwright, F Crossley, A Brown, with the trustees—J F Alexander. H E Mingey, and Geo Forder.

QUDENI FARMERS' ASSOCIATION.—President: P E Tittlestad. Vice-President: W Calverley. Hon Secretary and Treasurer: E Titlestad. Committee: H A Koch, S N Robbins, G M Anderson, B B Buntting, E Tittlestad.

RICHMOND AGRICULTURAL SOCIETY.—President: John Marwick. Vice-Presidents: W P Payn, J W T Marwick, C O and J W McKenzie and Chas Nicholson. Hon Treasurer: R Nicholson Hon Secretary: Cecil Williams. Committee: Evan Harries, R A McKenzie H M Moyes, Thos Marwick, J C Nicholson, J W Flett, A W Cooper, J.P., J W Hammond, C E Simes, Tom McCrystal, and the seven office-bearers (*ex-officio*).

RICHMOND ROAD FARMERS' ASSOCIATION.—President: Thos Stead, J.P. Vice-President: W Mapstone. Secretary and Treasurer: W L Stead, New Leeds P.O. Committee: D Malcolm, J Mapstone, W P Payne, J James, J Sinclair, W S Crouch, H B Boyd, W Middleton, W Oldfield, T E Horwood.

ROYAL AGRICULTURAL SOCIETY OF NATAL.—President: Sir G M Sutton, K.C.M.G. Vice-Presidents: W S Crart, Jas King, D C Dick, G J Macfarlane, C.M.G., O Hosking, with His Worship the Mayor, *ex officio*. Secretaries, Treasurers and Collectors: Duff, Eadie & Co, 12, Timber Street, Pietermaritzburg. Yard Superintendent: H J Stirton. General Committee: T J Allison, W H Buchanan, F G Burchell, W H Cobley, P H Campbell, R Comins, W P Gough, E S Goodwill, K H Hathorn, K.C., T W J Hall, J Hall, L Line, Col Sir D Mackenzie, K.C.M.G., Jas Morton, Sir T K Murray, Jno Moon, W J O'Brien, P Otto, R H Pepworth, J F Potterill, A Robinson, Rev J Scott, P D Simmons, H Solomon, W L Stead, H J Stirton, Dr Oddin Taylor, F W Jameson S J Mason. Executive Committee: President, Vice-Presidents, and W J O'Brien, W H Cobley, K H Hathorn, K.C., and Col E M Greene. Members appointed by Corporation: Councillors Ireland, Sanders and Hathorn.

SLANG RIVER (UTRECHT) FARMERS' ASSOCIATION.—Chairman: P J Kemp. Executive Committee: J J Uys, J Z Mooloman, T J Botha, P J Viljoen, P J Kemp. Hon Secretary and Treasurer, Thys Uys, Utrecht P.O.

UMSINGA-BIGGARSBERG FARMERS' ASSOCIATION.—President: E C Nuss. Vice-President and Acting Secretary: Geo S Saunders, Helpmakaar.

UMVOTI AGRICULTURAL SOCIETY.—President: Major T Menne. Vice-Presidents: Theunis J Nel, M.L.A., W J Slatter, W L'Estrange. Executive Committee: Tol Nel, A Newmarch, W Lilje, O Rottcher, S C Van Rooyen, W Newmarch, E J Van Rooyen, O Norton, I M Nel, J Browning. Managers of Show Yard: J M Handley and N Hunter. Hon Auditor: W K Ente. Secretary and Treasurer: W H Gibbs.

UMVOTI FARMERS' ASSOCIATION.—President: P R Botha (J.'s son). Vice-President: J M Handley. Secretary and Treasurer: G E Cadle (Box 6, Greytown). Auditor: J M Nel. Committee: W J Slatter, J G Nel, H F Torlage, R J Landsberg, A Newmarch, P H van Rooyen, A F Handley.

UPPER BIGGARSBERG FARMERS' ASSOCIATION.—President: W L Oldacre. Vice-President: G Langley. Hon Secretary: W F B Sutherland.

UTRECHT AGRICULTURAL SOCIETY.—Chairman: L Viljoen. Vice-Chairman: B H Breytenbach. Members: I Bierman, M M Knight, J H Klopper, B C Hattingh, T Botha, M Gregory, P L Uys, H P Breytenbach. Secretary: G J Shawe.

UTRECHT BOEREN VEREENIGING.—President: D J A van der Spuy. Secretary: G J Shawe, Utrecht.

VICTORIA COUNTY AGRICULTURAL SOCIETY.—President: Lieut-Col F Addison. Vice-Presidents: Sir Liege Hulett, Kt, M.L.A., W J Thompson, Esq, J.P., J Polkinghorne, Esq, M.L.A. Committee: Messrs W H B Addison, G S Armstrong, M.L.A., C Bishop, J.P., D Brown, sen, J.P., W Campbell, T C Colenbrander, A E Foss, J.P., A S L Hulett, J.P., J B Hulett, C Jackson, G Nicholson, J.P., T Polkinghorne, J W Perkins, J.P., E Saunders, J.P., G Stewart, and J H Stansell. Hon Secretary and Treasurer: H Curtis Smith (Stanger).

VRYHEID (WARD I.) AGRICULTURAL SOCIETY.—President: E Dalton. Vice-President: J F Potgieter. Secretary: F Kolbe. Assistant Secretary: H Lombaard. Committee: Secretary, Assistant Secretary, and A von Levetzow, T Ries, P Grobler, F Molman, A Steenkamp.

WEENEN AGRICULTURAL SOCIETY.—President: Allan Stuart. Vice-Presidents: R Garland, R H Ralfe, F I de Waal. Hon Treasurer: F C Schiever. Hon Secretary: E Cautherley. Auditor: S Wolff. Executive Committee: Hon H D Winter, M.L.A., J W Moor, M.L.A., D W. Mackay, T H Hindle and L L'Estrange. Manager of Show Yard: S Vaughan. Assistant: A Clouston.

WEENEN COUNTY HORTICULTURAL SOCIETY: Committee of Management: The President and Treasurer of the Weenen Agricultural Society and C J Offord, G W Linfoot, T J Nunn, Dr Brewitt, S Vaughan. Hon Secretary: F Cautherley.

ZULULAND FARMERS' ASSOCIATION.—President: F W White. Vice-President: C E Symonds. Secretary: R H McAlister. Committee: Hon D C Uijs, A W Symonds, H T James, R J Ortlepp, J N R Dixon.

ZULULAND COAST FARMERS' ASSOCIATION.—President: G H Hulett. Vice-President: C Hill. Hon Secretary and Treasurer: F Brammage, Ginginhlovu.

East Coast Fever Advisory Committees.

(NOTE.—Owing to sparse European population, the following Magisterial Divisions have no Advisory Boards: Ubombo, Mapumulo, Ingwavuma, Mahlabatini, Ndwandwe, Nkandhla and Hlabisa.)

ALEXANDRA.—Chairman: W Thompson, Umzinto. Members: H Bazley, R C Archibald, A Blamey, H Reynolds, G J Crookes, R Parkin, J A Curle.

ALFRED.—Chairman: Magistrate. Members: A G Prentice, Rev. S Aitcheson, J E Brown, F H Boddy, H M Raw, H Rethman, H C Hitchens, H J R Hatchwell, W P Bouscrie.

BERGVILLE.—Chairman: T E Zunckel, J.P., Bergville. Members: P H Van der Riet, J G Fannin, H Jackson, C Halforty, F Zunckel, Mbulali—Consulting member for natives.

BULWER.—Chairman: Magistrate. Members: R Comrie, Wm Colville, R Gordon, H Cole, P Garson, P McKenzie, G Malcolm, H C Gold, R Justice, E Stafford, W Little.

CAMPERDOWN.—Chairman: A N Kirkman, Cato Ridge. Members: J F Erfmann, P J Kingham, W B Turner, C J A Scheepers, W Mercer, L G Wingfield Stratford, J W Harvey, B B Evans, J W V Montgomery, B R Buchanan, W L Stead. SUB-DIVISIONAL BOARDS.—*No. 1. East of Railway Line from "Spitzkop" to Railway Line.*—Chairman: J F Erfmann, Cato Ridge. Members: P J Kingham, H Dinklemann, F L Meyer, J H Meyer, H A Meyer. *No. 2. East of Railway Line from West of Government Fence.*—Chairman: C J A Scheepers, Thorneybush. Members: W B Turner, W Mills, J F Scheepers, H Nadauld, G S Phipson. *No. 3. West of Railway Line from Koning Krantz to Killairney and along Umlaas River.*—Chairman: A N Kirkman, Clairmont. Members: W Mercer, W Brown, R Godfrey, W S Meyer, E W Meyer. *No. 4. West of Railway Line, rest of Division between Main Line, Umlaas River Boundary of No 3.*—Chairman: W L Stead, Thornville Junction. Members: F H Meyer, J R Schwegmann, W E Schwegmann, W S Crouch, B R Buchanan (Hon. Sec., Manderston). *No. 5. West of Main Line, Beaumont, East of Main Mid-Illovo River from Westley's Drift to Umguaranta River.*—Chairman: J W Harvey, Camperdown. Members: L G Wingfield Stratford, R Lyne, O A Hutton, E H Hayes, F E Groom. *No. 6. Mid-Illovo West of Line, rest of Division South of Umlaas River.*—Chairman: B B Evans. Members: J W V Montgomery, J H McCullough, J Ballam, J James, H S Power.

DUNDEE.—Chairman: F Turton, Glencoe Junction. Members: J Campbell, J J Grove, H Wiltshire, G M De Waal, Aug Jansen, A J Potgieter, A Cronje, A Schuid, H Greenhough. SUB-DIVISIONAL BOARDS.—*Glencoe Sub-area.*—Members: F Turton, H Greenhough, W H Miller, F Schroeder, V Marshall, J Lausen, J J De Jager, Rev Father Rauch (Native interests). *Hatting Spruit Sub-area.*—Members: J J Grove, H A J Davil, A E Norman, J Campbell, Rev J Dewar (Native interests). *East of Helpmakaar Road.*—Members: A M Cronji, D C Pieters, P Meyer, J A Naude, A Jansen. *West of Helpmakaar Road.*—Members: A J G Meyer, A P Lund, D C Uys, A J Van Tonder, Jun, A J Potgieter. Members of Joint Committee for *Area West of Helpmakaar*: A J Potgieter, A P Lund. Members of Joint Committee for *Area East of Helpmakaar*: A Jansen, A M Cronji. *Area between Main Vryheid Railway Lines.*—Members, W Craig, H Wiltshire, C M Meyer, Sen, A Spies, Jun, C M De Waal.

DURBAN BOROUGH.—Chairman: E L Acutt, Durban. Members: H R Bousfield, R Benningfield, G Swales, J Haynes, — Arthur.

EMTONJANENI.—Chairman: Magistrate. Members: F W Smith, H J James, F W White, A W Symmonds, R J Ortlepp, D C Uys, L J Van Rooyen.

ESHOWE.—Chairman: A Boast, Magistrate. Members: A Moore, G H Hulett, C F Adams, T Parkins, A T Wantink, F J Dickens, H H Thole.

ESTCOURT.—*Ward 2. East of Main Line.*—Chairman: A Stuart. Members: Magistrate, J Ralfe, J W Haw, J G Hatting, A Peniston, A B Haviland, C M Rudolph. *Ward No. 3.* (Boundaries): The Bergville Magisterial Division, Tugela

to junction of the two Tugelas; The Winterton Settlement fence to Vaai Plaats fence and Ovington and Sibhamie's Location fence, and from there to Government Game Reserve).—Chairman: H J De Waal, Glenisla. Members: R Gray, M Sanderson, R J Land, A Spearman, H L Bacon. *Ward No. 4* (Estcourt West of Railway Line; follow Bushman's River as far as Mr. Kerr's farm, then Nalaara's Location fence as far as Game Reserve).—Chairman: R H Ralfe. Members: F C Schiever, J Rencken, W Couch, P Male, T L Fyvie, J Hatting, A W J Hatting. *Ward No. 5* (Boundaries: Remainder of District West of Line).—Chairman: H Blaker, Estcourt. Members: W Comins, E B Griffin, H A Woodruffe, Col. Crompton, J Russell, A C Robinson, Jun, A E Downing, A D Shaw, J W Bentley.

GREYTOWN.—Chairman: Paul Hansmeyer, Greytown. Members: D Havemann, A Newmarch, J A Nel, W T Slatter, A T Handley, H S Botha. *Central Board.*—Chairman: P Hansmeyer, Greytown. Members: J A Nel, A Newmarch, W J S Newmarch, T K Taylor, S W Cadle, R J Van Rooyen, E J Van Rooyen, J G Nel.

INANDA.—Chairman: C R Bishop, J.P., Umgeni. Members: R Harrison, W Sykes, Jun, E Dore, W Campbell, R Armstrong.

KLIP RIVER.—*No. 1* (A line from Elands Laagte along the Matawaans and Jononos Kop to the Berg; North line, Dundee boundary: all West of Main Line).—Members: C Mitchell Innes, R M Gray, L Meyer, J C Henderson, C Allen. *No. 2* (O.R.C. line and boundary No. 1). Members: D Bester, A J Marais, W Allison, J Bester, — Brink. *No. 3* (From Klip River Bridge to Sand Spruit, and up Sand Spruit to its source in the Berg).—Members: H A Potgieter, A A Wetherell, B Nel, F Van Rooyen, H Portsmouth. *No. 4* (Rest of Division South and East of Sand Spruit and West of Main Line).—Members: W Leathern, H Illing, J H Newton, E Robinson, G W Willis. *No. 6* (Whole of Division East of Main Line).—Chairman: J G de Waal. Members: R A Smith, H Nicholson, P Cronje, J Farquhar.

KRANTZKOP.—Chairman: L L D Proksch, Krantzkop. Members: L M J Van Rooyen, L M J Van Rooyen, F E Van Rooyen, J H Van Rooyen, J P Zietsman, A Johnson.

IXOPO.—Chairman: Magistrate. Members: Thos Allen, Geo Martin, E Marriott, A Stone, G A Cooper, J.P., Wm Gray, D Campbell, F L Thring, J.P.

LION'S RIVER.—*No. 1* (Southern portion of West of Main Line).—Chairman: U K McKenzie, Lidgetton. Members: R J Spiers, F North, A McLean, J Morphew. *No. 2* (Northern portion West of Main Line).—Chairman: G Ross, Nottingham Road. Members: J Clouston, K Soutar, D Connel, D Smythe. *No. 3* (Southern portion East of Main Line).—J W Dicks, "Rosebank," Howick. Members: W M Henderson, — Buchanan, Jos Raw, H J McKenzie. *No. 4* (Northern portion East of Main Line).—Chairman: H Burgmann. Members: W Methley, G Hutchinson, J J Morton, B Taylor. (The whole of the members of the Sub-Divisional Boards constitute the Central Board with the Magistrate, Lion's River, as Chairman.)

IMPENDHLE.—Chairman: T Fleming, Boston. Members: J Martens, P J Lourens, T Carter, C W Brooke, J W McLean, H Boike, C C Lewis, W S Alborough, W Harrington, C W Roberts, D Tootell. *Sub-Committee appointed for Northern portion of Division* (added to Lion's River Division).—Chairman: P J Lourens, Insinga, *via* Nottingham Road. Members: H Boek, C N Brooke, T Carter, J Martens, J W McLean. *Sub-Committee for Southern portion of Impendhle.*—Chairman: T Fleming, Boston. Members: C C Lewis, W S Alborough, W Harrington, C W Roberts, D Tootell.

LOWER TUGELA.—Members: W H B Addison, A E Jackson, H E Essery, A S L Hulett, J Brown, W O Robbins.

LOWER UMZIMKULU.—Chairman: Col. J F Rethman, North Shepstone. Members: Col. J R Royston, D C Aitken, J.P., C H Mitchell, J.P., G P Beachcroft, Claude Manning, H Albers, N Harper, J S Clarke, A Borchard, T Stapleton, Col. Bru-de-Wold.

MOOI RIVER.—Chairman: W. G. Randles. Members: J. H. Wallace, H. F. Cadle, R. Garland, John Bartholomew, J. W. Johnstone, C. R. Skottowe, J. N. Boshoff, J. R. Lindsay.

MTUNZINI.—Chairman: Magistrate. Members: F Green, G M J Gielink, G Getkate, W Saville, A H Konigkramer.

NEWCASTLE.—*No 1* (to be known as Charlestown-Ingogo District from main line of Railway where it strikes the Southern line of the farm Cloutant West, thence along Western boundary of said farm, thence along S. W. boundary of Tipperary West, thence Southern boundaries of Hamstead, Dumferline and Roodeport, thence along the Northern side of the Botha's Pass main road to where it joins the O.R.C. Boundary, thence along the boundary of the Colony, thence along the Charlestown Fence to where it joins the Railway line near Mount Prospect Gate, thence along the Railway line to Cloutant West).—Chairman: J Vos, Charlestown P.O. Members: W J Adendorff, A J Johnstone, A Paine, A H Trouw, Angus Wood. *No. 2* (Newcastle district Southern boundary of No. 1 along Railway line from Cloutant West, including portion of Town Lands, Newcastle, which by agreement with Government is considered to be West of line, thence along Railway line where it strikes the Southern boundary of the farm Kopjeallen, thence along Southern boundaries of Kopjeallen, The Gardens, and Lincoln to the Ingagane River, thence up the Ingagane up to the farm Falixtowe, along Southern boundaries of Falixtown, Balwerton, Brooklyn, Stonehenge, Tathamscamp, Hanover, Ellensdale, Endsel, Bejuisel, Stelazies Kop, Mount Blanc, to O.R.C. border fence, thence along O.R.C. boundary joining Southern boundary of No. 1 at Botha's Pass).—Chairman: S W Reynolds. Members: F A R Johnstone, W Moller, J.P., L H S Jones, C Earl, F Meyer, J J Muller, — Van Breda, J Macdonald, J C Adendorff, E Sanders. *No. 3. Dannhauser District* (Bounded by Southern District No. 2 from the Railway line at Kopjeallen to the Berg, thence along O.R.C. border, the boundary between Newcastle and Klip River Divisions, thence along the Railway line to the farm Kopjeallen).—Chairman: W L Oldacre, Dannhauser. Members: Geo Friend, B Harrington, L J Muller, J Ecksteen, E Hodson, W Watson, Ted Twyman, G Langley, Don Urquhart. *No. 4* (East of Railway Line, along the boundary between Newcastle and Dundee Divisions from the Railway Line near Dannhauser to the Buffalo River, along the Buffalo River to the junction of the Ingagane, thence along the Ingagane to its junction with the Ineander, thence along the Ineander to the fence of the Newcastle Town Lands, known as the Eastern boundary of the Railway Line, thence along the Eastern side of the Railway Line to the Magisterial Division boundary near Dannhauser).—Chairman: T K Boshoff, Dannhauser. Members: J H Potgieter, H Miller, J H van der Westerhuizen, J J Kemp, W Dicks, C Uys. *No. 5* (the strip of land lying between the Railway Line and the Buffalo River from the Ingagane and Ineander streams, which form the North-Western boundary of No. 4 district).—Chairman: E W. Noyce, Boscobello P.O.; members, Geo Matthews, T K Panzera. *Central Board.*—Chairman: S W Reynolds, Newcastle. Members: F A R Johnstone, J Vos, Sen, Angus Wood, W Oldacre, W Watson, E W Noyce, F N Panzera, T R Boshoff, J H van der Westhuizen.

NEW HANOVER.—Central Board. Chairman: E Newmarch. Members: W W Bentley, T C Wolhuter, F Reiche, H Schmidt, E Lindhorst, W L'Estrange, A F McKenzie, W Meyer. *New Hanover Sub-Committee.*—Chairman: E Newmarch. Members: Jno Moe, W W Bentley, W Ortmann, T C Wolhuter, O J Muirhead. *Dalton Sub-Committee.*—Chairman: W L'Estrange. Members: A F McKenzie, R W Smith, G Reddinger, H Rosenbrock, J H Gordon, W Meyer. *Schroeders Sub-Committee.*—Chairman: F Reiche. Members: H Schmidt, E. Lindhorst, G Moe, P Rodehorst, H T Rohrs, F Gorden, A Meyer, W Fortmann.

NQUTU.—Chairman: A Barklie, Utrecht. Members: H Wilkins, R L Flindt, W A Westbrook, J W F Hall, Dr. Knight.

PAULPIETERSBURG.—Chairman: N J Els, Viljoen's Rust. Members: J B Rudolph, G J Combrink, A Schutte, A Bester, P H van Rooyen.

PIETERMARITZBURG.—Chairman: B Swete Kelly, Pietermaritzburg. Members: W S Crart, C A Fawcett, W E Goodwin, E G McAlister, E E Hodgson.

RICHMOND.—Chairman: Magistrate. Members: E E Johnson, J Mapstone, G D Alexander, C P Lewis, C Nicholson, W Comrie, John Marwick, W P Payn, A H Cockburn. *Sub-Division No. 2.*—Chairman: G D Alexander, Nel's Rust. *Sub-Division No. 5.*—Chairman: W Oldfield, Fox Hill.

REIT VLEI DISTRICT.—Chairman: D. E. Muir, J.P., Elsmore, Mooi River. Members: P. Otto, J.P., R. J. Van Rooyen, E. J. Van Rooyen, J. G. Nel, A. Kohrs, J. Hooper, Otto Norton (Hon. Secretary).

SEVEN OAKS DISTRICT.—Chairman: W J S Newmarch, Harden Heights. Members: H M Balding, J.P., J Crow, J T Martens, H Mayne, S W Cadle.

UMGENI DIVISION.—Chairman: E. S. Goodwill. Members: F. Schroenn, B. Crompton, C. Arnold, R. J. Potts, A. J. Tyler, F. J. Smith, A. Wood, J. P. Symonds, J. J. Potterill, W. H. Keytel, C. Lund.

UMLAZI.—Chairman: C Henwood, Durban. Members: W Pearcer, W Gillett, H Freese, L Jackson, P W Mackenzie.

UMSINGA.—*No. 1 District* (All farms lying West of the Umsinga-Helpmakaar main road).—Chairman: E C Nuss. Members: W W Strydon, J.P., J H Nuss. *No. 2 District*—(All farmers East of the Umsinga-Helpmakaar main road—excepting the farms Sutherland, Gordon, Memorial Mission and Pomeroy Town Lands, and Location lying North of the Mazabeko and West of the Buffalo River. —Chairman: W H Wholberg, P.O. Elandskraal. Members: H W Dedekind, J Dedekind. *No. 3 District*—(The remaining portion of the area lying in the Umsinga Division).—Chairman: A Muller. Members: M J Matheson, H Muller. The three Committees to constitute the joint Committee.

VRYHEID.—Chairman: A von Levetzow, Vryheid. Members: P Labuschagne, B E A Rabe, G M van der Westhuizen, J Kruger, J F Potgieter, L M N Nel.

WEENEN.—Chairman: C G Jackson, Weenen. Members: C Harding, J.P., P J van Rooyen, J.P., K Rottcher, S B Buys, J J Vermaak, L C Kinsman, J W A Pole, C F Vermaak, P R Buys, J C's son.

Publications Issued by the Department of Agriculture.

THE following publications, issued by the Department of Agriculture, are still in print, and copies may be obtained free (except those with price attached) upon application to the office of the *Agricultural Journal*, Department of Agriculture, Pietermaritzburg. The figures in square brackets (*e.g.* [1904]) are the years in which the various publications were issued.

No. BULLETINS.

2.—"Manures on the Natal Market, 1902," by Alex. Pardy, F.C.S., Analyst. [1902.]

4.—"Manures on the Natal Market, 1903," by Alex. Pardy, F.C.S., Analyst. [1903.]

6.—"Manures on the Natal Market, 1904," by Alex. Pardy, F.C.S., Analyst. [1904.]

7.—"Tree-planting in Natal," by T. R. Sim, F.L.S., Conservator of Forests. [1905.] (*Price 2s. 6d., post free.*)

8.—"Agricultural Co-operation," by E. T. Mullens, Secretary, Minister of Agriculture. [1905.]

10.—"Manures on the Natal Market, 1905," by Alex. Pardy, F.C.S., Analyst. [1905.]

11.—"East Coast Fever," by S. B. Woollatt, Principal Veterinary Surgeon. [1906.]

12.—"Manures on the Natal Market, 1906," by Alex. Pardy, F.C.S., Analyst. [1906.]

13.—"Report on the Disease known as 'Bluetongue' in Sheep," by H. Watkins-Pitchford, F.R.C.V.S., F.R.S.E., Govt. Bacteriologist and Director, Govt. Laboratory. [1908]

14.—"Poultry-Keeping in a Simplified Edition for Farmers," by F.C. [1908.]

15.—"The Export of Citrus Fruit," by Claude Fuller. [1909.]

16.—"Some Common Bagworms and Basketworms," by Claude Fuller. [1909.]

17.—"Dipping and Tick-Destroying Agents," by H. Watkins Pitchford, F.R.C.V.S., F.R.S.E., Govt. Bacteriologist and Director, Govt. Laboratory. [1909.]

REPORTS.

Annual Report of the Agricultural Department, 1902. (Includes Reports of the Director of Agriculture, Entomologist, Conservator of Forests, Dairy Expert, Editor *Agricultural Journal*, etc.) [1903.]

Report of the Secretary, Minister of Agriculture: January 1, 1903, to June 30, 1904. [1905.]

Report of the Secretary, Minister of Agriculture, for the year ended 30th June, 1905. [1905.]

Report of the Secretary, Minister of Agriculture, for the year ended 30th June, 1906. [1906.]

(For a continuation of the statistics given in these reports see reprint "Natal's Progress in 1906," noted below.)

Fourth Report of the Government Entomologist: 1903-4. [1905.]

Fifth Report of the Government Entomologist: 1904-5. [1906.]

Sixth Report of the Government Entomologist: 1905-6. [1907.]

(The Third Report of the Entomologist is included in the "Report of the Agricultural Department, 1902," noted above.)

Report of the Conservator of Forests, 1902. [1903.]

Interim Report of the Conservator of Forests up to December 31, 1905.

Report of the Principal Veterinary Surgeon, for year ended 30th June, 1906. [1907.]

First Annual Report of the Land Board, 1905. [1906.]

Annual Report of the Land Board, 1906-7.

MISCELLANEOUS REPRINTS, ETC.

Black Spot ("Letter Book Pages": reprinted from *Journal*.)
Mealie Grubs (do do)
Mosquitoes (do do)
Woolly Aphis (do do)

Cotton. By A. N. Pearson, Director, A. E. & C. (Reprinted from *Journal*: 1904.)

Co-operation. By E. T. Mullens, Secretary, Minister of Agriculture. (Reprinted from *Journal*: 1907.)

Citrus Fruit Export. (Reprinted from *Journal*: 1907.)

Natal's Progress in 1906. (Reprinted from *Journal*: 1907.) The statistics contained in this paper are on the same lines as those in the Annual Reports for previous years of the Secretary, Minister of Agriculture.

Natal's Progress in 1907. By H. J. Choles, F.S.S. (Reprinted from *Journal*: 1908).

Fibre Cultivation. (Reprinted from *Journal*: 1907.) This paper is a summary of Bulletin No. 13 of the Department of the Interior, Bureau of Agriculture, Manila.

Sisal, Mauritius Hemp and other "Aloe" Fibres. By T. R. Sim, F.L.S., Conservator of Forests. (Reprinted from *Journal*: 1907.)

The Fibre Industry of Mauritius. By Leonard Acutt, J.P., Tongaat; Member of the Land Board, Natal. (Reprinted from *Journal*: 1907.)

South African Products Exhibition, 1907. Report of T. R. Sim on the Natal Exhibits. (Reprinted from *Journal*: 1907.)

Poplar Timber for the Local Manufacture of Matches. By E. R. Sawer, Director, E.S. (Reprinted from *Journal*: 1908.)

Agricultural Industries and Land Settlement in Natal. [1907.]

Judging Fruit, Flowers, Plants and Vegetables at Shows. By T. R. Sim, F.L.S., Conservator of Forests. [1906.]

Agricultural Statistics, Natal, 1905-6. [1907.]

Model Rules for Agricultural Co-operative Societies. (*Price 1s., post free.*)

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Tuberculin, per dose	0	4
Anti-Venene (for snake bites), per dose	5	0
Blue Tongue Vaccine, per 25 doses	2	0
Blue-Tongue Curative Serum, per 50 cub. c.	2	6
Quarter Evil Vaccine (in five and ten dose packets), per dose	0	3
Q. E. V., Double Inoculation, per dose	0	6

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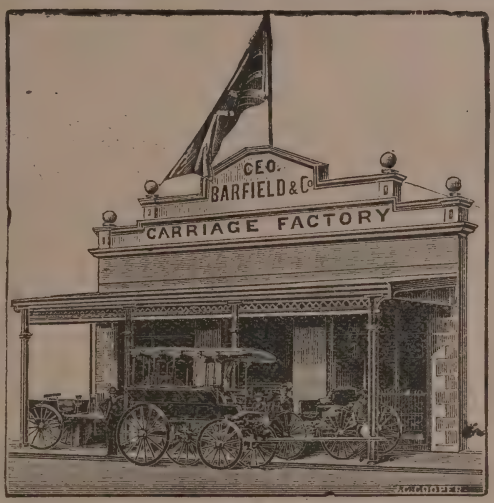
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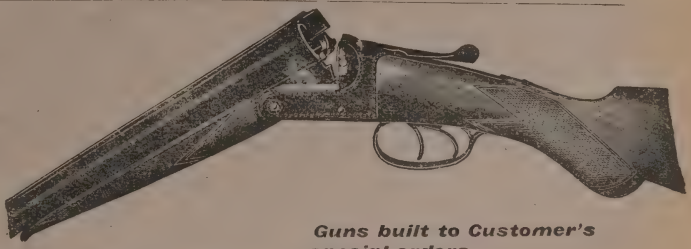
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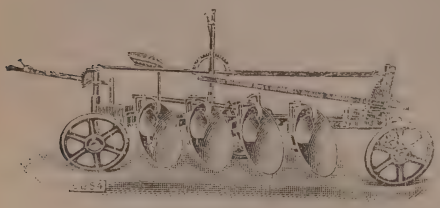
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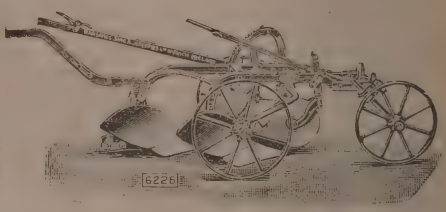
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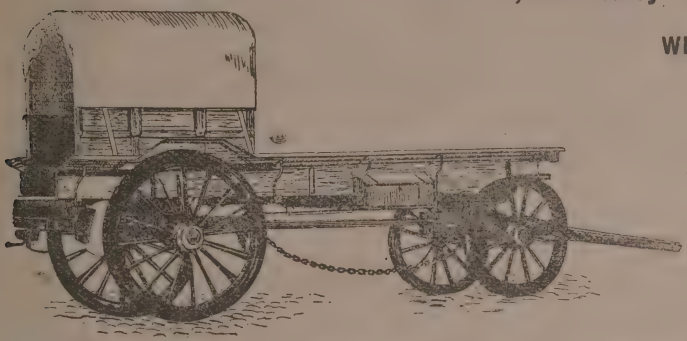
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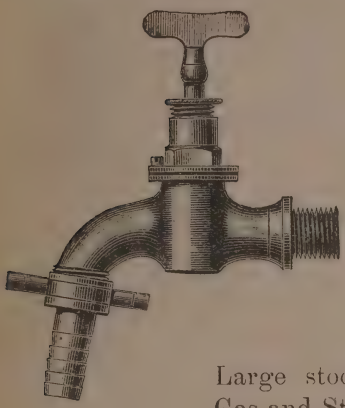
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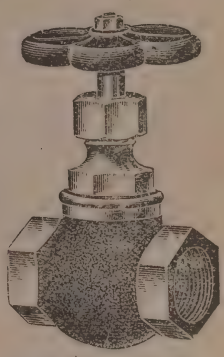


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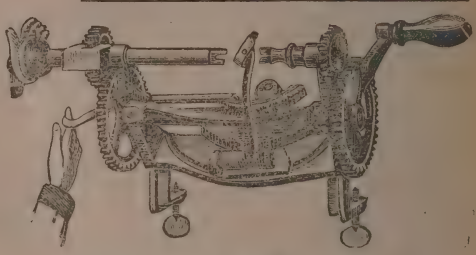
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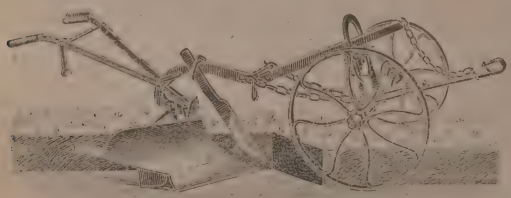
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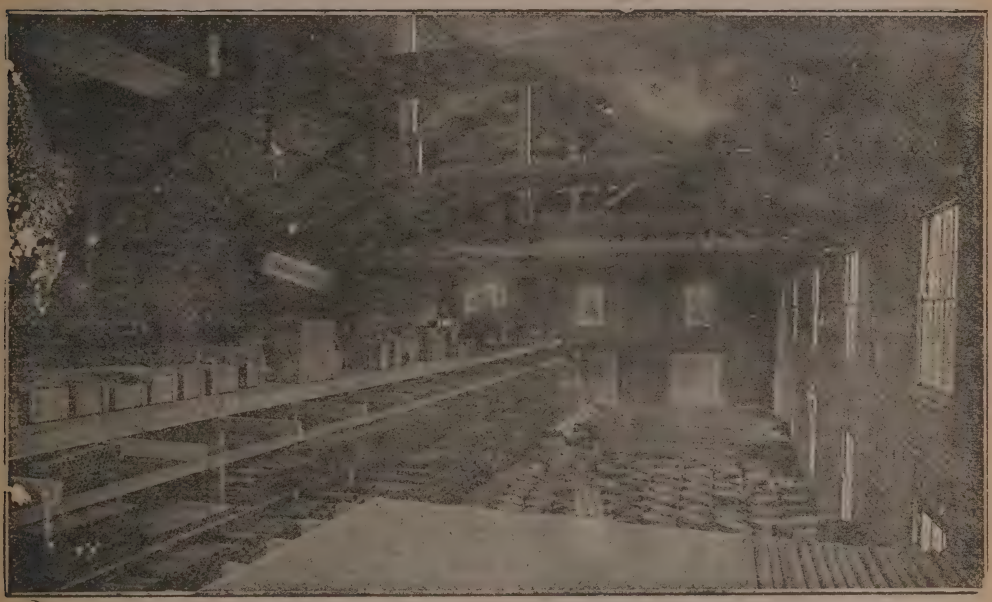
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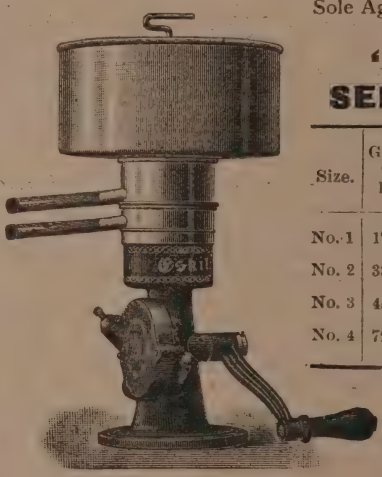
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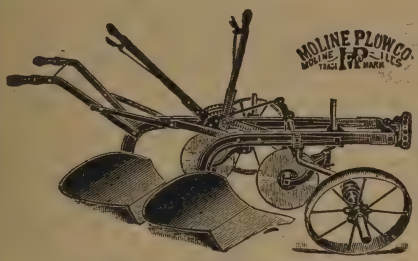
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The Journal is issued on the last Friday of every month.

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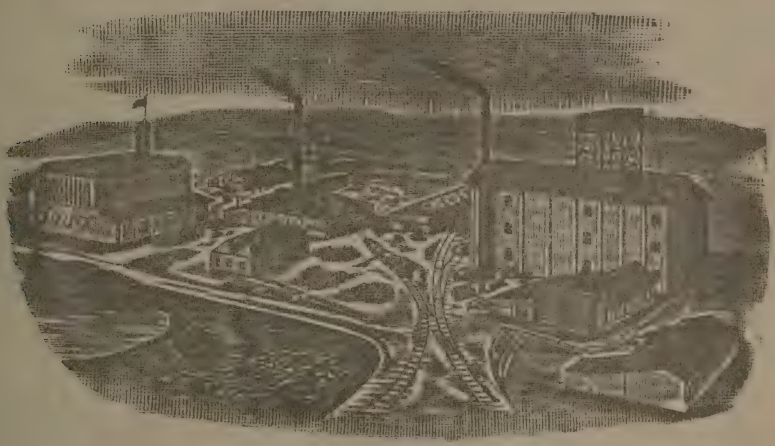
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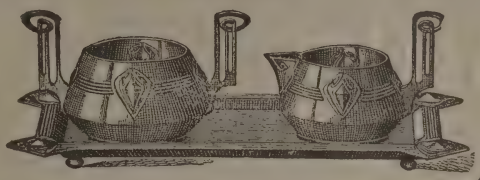
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Vol. XIII., No. 5. *NOVEMBER 26, 1909.*



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Published for and Edited in the Department of Agriculture.

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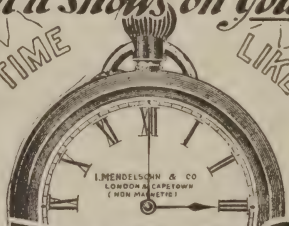


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*** *"The Markets and Crops," issued as a supplement with each number of the* Journal, *contains full information regarding South African and oversea markets and corp conditions, and Commercial Intelligence Bureau announcements.*



BABY BEES.

(See article by Miss Ritchie in this month's issue)

VOL. XIII., NO. 5. NOVEMBER 26TH, 1909.

The Natal Agricultural Journal.

Maize Prospects.

WE are now in the middle of the planting season for mealies. Last year planting commenced late, on the whole, the idea being to try and escape as far as possible the ravages of the mealie grub; this year planting is being done quite as late, partly for the same reason and partly on account of the unfavourable soil conditions which have prevailed owing to the unusual dryness of the weather. In regard to this latter point, matters have in some districts been somewhat serious, and even now it is doubtful whether in those districts the area that is being planted with mealies is even as large as that of last year. The spring opened with promise of a fair season all round. Owing to the late rains that were experienced in autumn the ground on the whole at the end of winter was not as hard as usual, and it was still further improved by good rains at the beginning of the spring. As we have said, the season promised to be a wet one, but the rains gradually diminished, and eventually a state of affairs that bore a strong family resemblance to drought made its appearance in many districts: some parts of the country, indeed, hardly saw a drop of rain for two months or more. This at ploughing time was not a state of things to sweeten farmers' tempers. Disc ploughing was tried, but the resulting clods were too large and too hard to be broken up without the expenditure of an undue amount of time and labour. In some parts of the Colony, however, rains have fallen—but only just in time, and not to as great an extent as the dry state of the ground warrants. How the season, from a fortnight to six weeks before planting time, compares this year with last is clearly shown in our usual rainfall diagram published in the MARKETS AND CROPS supplement this month.

Thus much for the hampering influence of the bad weather. Another

factor of which mention should be made in passing, is, of course, the influence of East Coast Fever upon ploughing and planting. Draught power this season is perhaps scarcer than it has been for many years past; in some cases farmers still have their cattle, untouched as yet by the disease; in other cases "salted" herds are in evidence—the owners of these herds are the luckiest farmers of all, and although the herds are naturally very small seeing that the mortality from East Coast Fever is something like 95 per cent., nevertheless they serve all the purposes of ploughing, harrowing, and, later, of planting and cultivating. Other farmers, again, have been able to secure mules and donkeys; whilst a proportion of the farmers again have benefited by the Government steam ploughs. Ploughing is thus being done somehow—certainly not to as great an extent as would have been the case had conditions been quite normal (and there is no doubt that in such case the area put under mealies this season would have been considerably higher than that of previous seasons), but at the same time the main object, namely, to get in an average crop, is, we think, being accomplished, taking the Colony as a whole.

What all this means is this: that the season—the mealie season proper—has opened relatively badly; ploughing operations have been hampered by the undue dryness of the weather and consequent hardness of the ground, and partly also by the comparative scarcity of draught power; and as a result (*a*) perhaps a slightly lesser area, but at any rate we hardly think a greater area, has been put under the crop this year as compared with last season, and (*b*) the ground in many cases has not been converted into as good a seed bed as could be desired. Mealies, however, are hardy plants, and doubtless the crop will not suffer very much from this cause.

Under such hampering conditions does the present mealie season commence. We refer to them as hampering conditions because they will probably result in the restriction of the total area under mealies to the limits of last year. If they do no worse than this we shall have little to grumble at (and we do not altogether think that the area will be very much lower than that of last season), but naturally we are desirous of seeing an annual extension, to a very appreciable degree, of the area under the staple crop of the Colony, and any hampering of that extension, any set of conditions which will restrict the increase of the area even for a single season, we are naturally inclined to view with impatience. There will probably be no *real* loss to the Colony this season, but, had conditions been more favourable, the *gain* to the Colony might have been relatively great. Our area under mealies must increase annually, given favourable conditions; we have an almost unlimited market oversea—unlimited, at any rate, so far as Natal is concerned— and the more grain we can ship oversea the more we shall add to the wealth of the Colony.

But these nowadays are commonplaces. Of greater import to the

farmer, perhaps, will be a few remarks on mealie growing generally and on the essentials for securing large crops.

In most farmers' minds, the outstanding essential is undoubtedly manure—bone dust, superphosphate and other grain-forming phosphatic manures. To many farmers, too, the word Manure comprises the sum-total of the requisites for large crops. Ploughing and preparing the ground, of course, they accomplish in some fashion, not with any view to increasing the yield of the crop but merely to provide a medium for the growth of the plants—a medium wherein the seed may germinate, and wherein, later, the roots of the plant may seek food and moisture. A cultivation or two cleans the weeds from between the rows; and, the fertiliser having already been applied at the time of planting, all that now has to be done, is to wait patiently for the formation, ripening, and drying of the grain.

Manuring is a very desirable practice, and, in most lands perhaps, it is necessary. It is, however, not everything in mealie growing. However, as we are on the subject, let us say now what we have to say on the matter. To secure large yields of grain the first thing that is necessary is manuring with phosphatic manures. To many this is the only kind of manuring that is necessary. In America, however, it has been found that, within certain limits, the greater the growth of stalk, the more the grain that will be secured. Farmers' Bulletin No. 199, of the United States Department of Agriculture, says, on this point:

> The nature of the corn [*i.e.*, maize] plant is such that it will not produce grain unless the soil is rich enough to afford a considerable growth of stalk, and . . . *the best yield of ears is not obtained unless the stalks have made a maximum growth.*

The italics are our own. In Natal, only on the Coast has this been found to hold good, and there nitrogenous manuring is really essential if the best results are to be obtained: in fact, after two or three seasons' manuring with phosphoric acid it has been found that further manuring with this substance decreases rather than increases the yield of grain. Elsewhere in the Colony—in the Midlands and Uplands—nitrogen does not need to be added to the soil; phosphoric acid only needs to be applied—for the first two or three years at any rate: thereafter the application of potash along with the phosphoric acid is attended with beneficial results. More on these points we shall have to say on a future occasion.

For the benefit of Coast farmers, then, it may be stated that nitrogenous manuring may be done in various ways: kraal manure may be added to the soil—a method of manuring which is quite impracticable in this country over large areas;—commercial nitrogenous fertilisers may be purchased and applied to the land (a method which we would not advocate in this country for various reasons, except perhaps in certain special cases, since it must mean a lessening of the profits even

though the yield of grain is increased); and finally, green manuring may be resorted to. Of all three methods the last is the one which we would strongly recommend as the cheapest, as perhaps equally effective as manuring with commercial fertilisers, and as one which will add to the humus content of the soil perhaps quite as well as does kraal manure. Green manuring, again, can be divided into two classes—manuring with leguminous crops, and manuring with non-leguminous plants. The former method results in the addition of nitrogen in the soil, nitrogen collected from the air by bacteria living on the roots of the plants, and adds to the humus content of the soil; the latter method does not add any nitrogen, so far as is at present known to science, but it enriches the soil from a humus point of view. Obviously manuring with leguminous crops is the kind of green manuring that should be practised in connection with mealie growing.

By thus enriching the soil in nitrogen, maize plants are produced of sufficient growth of stalk to enable the plant to make the best use of the supplies of phosphoric acid added at the time of planting in the form of bone dust or superphosphate, for the formation of grain. In passing we might add that, although we have coupled bone dust with superphosphate on two or three occasions in the course of our remarks, we recommend the use of superphosphate in preference if the manure is to be added at the time of planting, since bone dust is relatively slow in its rate of disintegration, especially if the animal fat which bones contain has not been removed prior to crushing, and there is always a risk of the season's passing without full use having been made of the phosphoric acid contained in the bone dust. In manuring for a subsequent season—as, for instance, manuring at the present time for the 1910-11 season—bone dust is useful.

So much for manuring. The preparation of the soil before planting, and its cultivation after the mealies have come up, are matters that call for attention on the part of the farmer who would raise good crops. It goes without saying that the soil should be as finely divided as possible—in good tilth, that is to say. If the soil is deep, ploughing should be done as deeply as possible within the limits prescribed by the depth of the soil. This remark does not, however, apply to soils that are of a clayey nature; in such cases subsoiling should be resorted to, and at the same time the growth and turning under of a leguminous crop will be found of much benefit in rendering the soil more friable. In connection with this preparation of the land the question of the conservation of moisture is one that should receive every farmer's attention, especially in districts that are apt to experience periods of drought. Of course in Natal as a rule we have comparatively little to fear as regards lack of moisture sufficient for an ordinary growth, since we get most of our rains in the summer months; but at the same time there are seasons when the mealie crop

suffers from want of even a sufficient amount of moisture, and besides this there are many districts which do not boast as large a rainfall as would be advantageous for the mealie crop to have under ordinary conditions of cultivation. The mealie plant requires a very considerable amount of moisture in order to make its best growth: it will do with comparatively little moisture, but it does not make really good growth unless it has the benefit of a large amount of moisture. We are not going to advise irrigation, but what we would advise is the preparation of the land in order to prevent evaporation and also loss by drainage. To prevent evaporation a surface dust mulch is necessary, as by its provision capillarity is broken and the moisture below this cannot reach the surface to become absorbed by the atmosphere. To prevent loss by drainage the provision of a subsoil mulch, as it may be termed, is requisite. In other words, subsoiling should be resorted to, in order to break up the subsoil and put it into such a condition that it will hold most of the moisture that falls as rain and sinks into it. If the subsoil is of clay and so compact as to turn water and not absorb it, it should be rendered permeable by the growth of deep-rooted crops such as lucerne, clover, etc., which will send their roots deep down into it and these as they eventually decay will leave the subsoil riddled with numerous fine passages. As regards the surface mulch to which we have referred, this is provided by cultivation after heavy rains. After as many heavy rains as possible—that is to say, when the weather appears to be settling for a dry spell—the ground between the rows should be cultivated, so that the moisture that has sunk into the soil from previous rains may be prevented from evaporating. The mulch should be as fine as possible in order to answer its purpose, without any undue proportion of clods.

The question of the depth of planting is another matter to which we may here devote a little attention. Let the depth be governed by the quality of the soil: if the soil is of a more or less sandy nature the seed may well be planted about three or four inches deep; but if it is of a heavy, compact nature one inch is quite deep enough. It should be borne in mind that, for the early growth of the germinating plant, the seed contains a certain amount of food—sufficient, in fact, for the growing tip of the plant under proper circumstances to reach the surface. If the seed is planted deeply in a heavy soil the food supplies in the seed will be exhausted before the surface is reached and thus the young plant will perish. In a light soil, on the other hand, seed planted at the same depth will have a good chance since owing to the lightness of the soil the young plant will have a better chance of pushing its way through the soil to the surface.

This article is growing in length, and we must accordingly restrict our remarks from considerations of space. A few words, however, about cultivation will suitably bring our remarks to a close, reserving whatever

else we have to say on the subject of mealie cultivation for another occasion. Cultivation should not be done too deeply, and for this reason chiefly: that the roots of the plants come very near the surface, and there is always a danger of breaking those roots. Although the plant will send out another root to replace the broken one, this at the same time is something of a drain upon the vitality of the plant and should be avoided. After the plants have attained a height of three or four feet the soil should, even in the middle between the rows, not be cultivated to a greater depth than three or four inches. All that is necessary in cultivation is to rid the ground of weeds and to break up the crust formed by the action of heat after heavy rain, and for these purposes only very shallow stirring of the soil is necessary. There are occasions, of course, when deeper cultivation is necessary, as when the soil has become compacted after very heavy rain, but such cases are the exception rather than the rule.

With these few hints we will bring this article to a close, but we hope on some future occasion to return to the subject at greater length in the course of a special article.

Cedara Students at Wool Sales.

AN interesting departure in the curriculum of the School of Agriculture at Cedara, and one which at the same time will be attended with beneficial results to the students, was inaugurated recently in the form of a visit by a party of students, under the charge of Mr. J. J. McCall, the Wool Expert at the Farm, to one of the wool sales held regularly by Messrs. Reid & Acutt's Wool Mart, Ltd., Durban. This visit was the result of an invitation, kindly extended to the Cedara School of Agriculture by the management of the Wool Mart, for a party of the students to attend one of their weekly sales, as an object lesson in how wool is valued and disposed of in South Africa. The invitation was accepted for the sale of the 3rd of the present month, and a party of eight students was selected to attend. At 9 o'clock on the morning of the 3rd the party, in Mr. McCall's charge, visited the Wool Rooms, and, after sundry introductions to buyers and others interested, proceeded to go around and inspect the different lots catalogued. Mr. McCall had previously placed before the students about 60 samples of wool which had been sold on the previous sale, together with the firm's wool experts' valuation and the

actual price realised. This, of course, in itself was of high educational value. The students were then each given a catalogue, and under Mr. McCall's guidance were taken around the various lots (of which there were some 360 in all), to exercise their judgment in valuing the different wools. This naturally occupied the greater part of the morning; and, Messrs. Reid & Acutt having kindly provided for lunch at the Marine Hotel, the party proceeded there at one o'clock accompanied by the secretary, Mr. Anderson, and some of the buyers, whilst later on they were joined by Mr. Sidney Green, the Managing Director of the firm. After lunch the students returned to the sale rooms and attended the sale, where they had the opportunity of verifying their valuations against the prices obtained. It may be of interest here to mention that wool from the Cedara Farm was offered at this sale and obtained the satisfactory price of 10⅜d. for Merinos. As the students had assisted in the shearing, rolling, skirting and packing of this wool, under the superintendence of the Wool Expert, they were given an insight into what the careful handling of wool means when it comes to be realised in the open market. On the same sale there were two other lots of wool from the Loteni district, the owners of which had got up their wools personally and had followed the instruction imparted by the Wool Expert at his recent demonstration at that centre, and those two lots fetched 11⅛d. and 11½d. respectively, a result which hardly requires further comment.

The students who had the privilege of attending this sale deserve commendation for the interest they took in all the proceedings, and generally in all matters pertaining to the industry, and they evidently made it a pleasure rather than a duty to learn all they could. A pleasing feature of the visit was the amount of interest shown in this new departure by the buyers, both English and German, who expressed pleasure at seeing so many eager youths apparently taking delight in picking up wrinkles. As was to be expected, everyone was exceptionally busy, as it was the largest sale that had so far been held; furthermore it was an extremely hot day and very trying to tempers; but the buyers never seemed too busy to answer a question or two regarding values and condition, and one and all expressed the hope that this innovation would become an established custom in connection with the Cedara School of Agriculture.

There is no doubt that visits such as this will be of great educational benefit to the students at Cedara, and will serve to assist largely in developing their judgment—a quality much needed by every wool grower. The thanks of the Department are due to the management of Messrs. Reid & Acutt's Wool Mart, Ltd., for their courtesy in connection with this visit of the students to one of their sales, and we feel sure that much good was derived from this particular visit by the students who were given an opportunity of availing themselves of the invitation.



Helianti.

A NEW fodder plant, known as "Helianti," is beginning to attract attention in England, and was referred to in his "Farm and Garden Notes" by Mr. Geo. Carter in the August issue of the *Journal*. If the plant is all that it is claimed to be, it promises to occupy an important place on farms situated in localities suited to its growth. It appears that the plant hails from North America, and that, in its present form, it is the result of years of careful cultivation by a leading French horticultural expert. It belongs to the leguminous class of plants—one fact alone which gives it an interest in the eyes of the progressive farmer—and it is stated to make excellent green fodder, ensilage or hay (having an enormous growth above ground), and exceeds (so we learn from a leaflet that has been sent to us) both in green and dry weight and animal food the best known forage plants such as clover, sainfoin, etc. We further read that "the dry weight is alone exceeded by lucerne, the proportion being 24 per cent. in helianti to 26 per cent. in lucerne, but helianti produces no less than three times the weight of growth per acre, and according to analysis contains the extraordinary amount of over seven per cent. of sugar in the dry forage." Such statements as these would themselves be sufficient to excite widespread interest in this new plant, but this is not all, for helianti also produces "a huge crop of tubers of extreme value, in weight exceeding that per acre of potatoes several times over, and indeed rivalling that of the mangel. . . Horses, cattle, pigs and sheep all eat them greedily and do well upon them. Horses prefer them to mangel even when fresh raised. Cows do well and give more milk and butter when fed upon helianti either as tubers, hay or ensilage, and the butter possesses the very best of flavour, even better than that produced by feeding lucerne. Pigs fed upon the tubers make the best flavoured pork on the market. Poultry feed well and fatten quickly upon a mixture of half-cooked tubers and bran." As might be expected, however, a heavy crop of forage and of tubers cannot be raised the same season; if a crop of tubers is desired, then no

forage must be cut, but all allowed to mature. The dense growth then dies back, and the tubers resulting may be raised late in the autumn.

An idea of the food value of helianti may be gathered from the analyses which have been published of the tubers, stems, and leaves of the plant. The leaves are said to contain: Proteids, 3·50 per cent.; fats, 0·66; total sugars, 0·44; carbohydrates, 13·88; cellulose, 1·67; digestible fibre, 1·25; insoluble minerals, 1·90; and water, 76·70. An analysis of the stem has given the following results: Proteids, 3·10 per cent.; fats, 0·13; total sugars, 7·18; carbohydrates, 9·15; cellulose, 3·61; digestible fibre, 0·83; insoluble minerals, 0·40; water, 75·60. The tubers analyse as follows: Proteids, 5·31; fats, 0·48; sugars and carbohydrates, 18·65; cellulose, 1·32; minerals, 1·76; water, 72·48.

This new fodder plant is certainly worth a trial in this country, providing our climate will suit it. About this there does not seem to be very much doubt, however—in the midland and upland districts, at least—in view of the statement which has been made to the effect that in 1906 it withstood a great drought in France, Algiers and elsewhere better than any other farm plant, and that it is equally hardy in standing frost and heavy rainfall. It may be that it has already been introduced into Natal, and it that is the case we should be glad to hear from anyone who has had any experience with it. We may add, in conclusion, that the tubers can be allowed to remain down three or four years without lifting, which is a further point in its favour. Mr. Carter is obtaining a few of the tubers for trial, and the result of his experiment will be awaited with interest.

Examination of Potatoes Entering O.R.C.

Notification has been received from the Director of Agriculture of the Orange River Colony to the effect that, under O.R.C. Government Notice No. 68, 1907, all consignments of potatoes entering that Colony, or offered for sale, which in future appear on examination to be infested with the disease White Rot (*Nectra solani*, Pers.) or any other disease, except Black Scab (*Chrysophlyctis endobiotica*, Schil.), will until further notice be re-sorted at owner's expense, a charge of 6d. per case or bag being made in order to cover the cost of re-sorting. All consignments of potatoes which are found on examination to be infested with Black Scab (*Chrysophlyctis endobiotica*, Schil.), will not be re-sorted but will be confiscated and destroyed. The Director of Agriculture concludes: "Farmers and merchants should note that Black Scab or warty disease of the potato (*Chrysophlyctis endobiotica*, Schil.), has not yet appeared in South Africa; it is therefore of the greatest importance to prevent its being introduced."

Enquiry for Cigar Boxes.

We have received from a correspondent a request to be placed in communication with a manufacturer of cigar boxes. Should there be among our readers any persons engaged or interested in the manufacture of these boxes, we would be glad if they would communicate with us as early as possible.

Milk-Giving Sheep.

In pursuance of an enquiry by one of our farmers respecting Hungarian milk-giving sheep, the Commercial Agent for Natal addressed a letter on the subject to the Secretary of the Co-operative Association of Hungarian Farmers, and he has received a reply stating that the sheep are extraordinarily hardy, being kept in the open during both the summer and winter months. The percentage of fat contained in the milk from the Hungarian milk-giving sheep is stated to be large and the wool is long and good. Eighty per cent. of these sheep bear twins. The Co-operative Association of Hungarian Farmers state that they are convinced that this class of sheep would be much appreciated in Natal. Shipping would be practically effected in lambs. The most convenient port of shipment in Hungary is Fiume. The price of such sheep is from £3 to £5 per head according to quality.

Prices of Mutton.

Advices from London go to show that wholesale prices of frozen mutton and lamb in the United Kingdom have undergone what is stated to be an unprecedented advance, owing it is explained, to unexpectedly short shipment from the Argentine, as the result of drought, and also from New Zealand and Australia. It would seem that this increase in wholesale prices will not necessarily result in a rise in retail prices, inasmuch as butchers have for some time been buying frozen mutton and lamb on exceptionally favourable terms, which have not been reflected in reduced charges to the consumer. The remarkably low level at which prices have ruled during the summer in the wholesale trade is shown by the following figures referring to New Zealand (North Island) mutton and lamb, taken by the London *Daily Telegraph* from a meat circular issued by one of the leading meat importers. The prices for August of last year are given for purposes of comparison:—*Mutton*: May 28th, 1909, 1½d. to 2⅝d. per lb.; August 13th, 1909, 1⅞d. to 2½d. per lb.; October 15th, 1909, 4⅛d. to 4¼d.; August 13th, 1908, 3⅜d. to 3⅝d. *Lamb*: May 28th, 1909, 3¾d. to 4¾d.; August 13th, 1909, 3d. to 3½d.; October 15th, 1909, 4⅜d. to 5¼d. per lb.; August 13th, 1908, 5¼d. to 5¾d. per lb. These figures show the great jump that was made in prices on the 15th of last month. All classes of mutton and lamb were correspondingly low during the 1909 summer.

Natal Sugar Association.

We are pleased to be in a position to inform the readers of the *Journal* of the formation of a Natal Sugar Association representing sugar planters, sugar manufacturers, and others interested in the Natal sugar industry, with Mr. John Kirkman, M.L.A., as president, and Mr. Jas. McBride as vice-president. The Association has been formed with the object of the promotion of the general welfare and advancement of the sugar industry and the improvement of the quality of its products and the better co-operation of growers and manufacturers and merchants who deal in sugar.

Hail Prevention.

We have received from the Commercial Agent for Natal a copy of a letter which was received by him in reply to a letter which he addressed to His Majesty's Charge d'Affaires in Berne regarding hail prevention. It is stated in the letter that experiments have been carried out in Switzerland with a view to preventing hailstorms by shooting, but that, this method having proved inefficacious, no methods of hail prevention or for the protection of trees from hail are now adopted in that country. The measures now adopted with regard to damage by hail are confined to insurance by the Cantonal Governments and to the grant by the Confederation of subsidies for the encouragement of such insurance. According to the recent statistics published by the Swiss Department of Agriculture, the Confederation granted to twenty Cantons in 1907 the total sum of £6,547 for this purpose.

Caravonica Cotton.

The Department of Agriculture has received from Messrs. S. A. Nathanson Commandite, P.O. Box 261, Durban, a letter stating that they have secured the sole agency in South Africa for the Caravonica Cotton Central Office. They are disposing, under certain conditions, of specially grown seed (produced by Dr. Thomatis after many years of experimenting) the cotton grown from which they guarantee to be of the finest quality so far known, higher prices, they state, being paid for this cotton than for any other cotton in the market. They bind themselves to buy, or, if growers prefer, to sell for them in Europe, any quantity at a fixed price for years to come; and the conditions on which they supply seed (which they do free of charge f.o.r. Durban) are: (*a*) Intending growers must make application to Messrs. S. A. Nathanson Commandite for Caravonica seed, stating situation, size, and proprietor of farm; (*b*) growers must follow the instructions furnished with the seed *re* cultivation and must allow Messrs. S. A. Nathanson Commandite to inspect the cultivated area at any time; (*c*) Messrs. S. A. Nathanson Commandite to receive five per cent. of outturned crop, either in cotton or cash at option of growers.

A New Baling Press.

A new baling press has been put on the market by Messrs. Shirtliff Bros., Hampton Hill, Middlesex, England, under the patented name of the "Bijoli" Baling Press. This press has been scientifically designed to give a gradually, but enormously increasing pressure on the bale, as it is required, while at the same time keeping the motive power almost constant. The press can be worked by hand power, animal power, or by a belt off any prime mover, such as a steam, gas or oil engine, electric motor or water wheel. They are also built in two types, to suit different requirements as to head room. Where the head room is limited, they are inverted. It is worked by turning the winch which winds in the wire rope and pulls the system of levers together, thereby pressing down the follower or pressing platen. When the bale has been fastened with rope lashings, wire or steel hoops, the press returns to its initial position when the brake is released It is stated that no foundations are required, but only a small hole has to be dug, into which the lower beams are bedded and the press set plump. The press is practically made entirely of mild steel, only some parts of the winches being of cast iron.

Mealie Grub and Totofianas

The following notes are extracted from a letter received by the Government Entomologist from Mr. C. T. Brookes, dated 28th October, 1909, which are of much interest in connection with the development of the mealie grub and totofianas. Regarding top grub, he says:—"Upon reference to my diary, I see that upon the 2nd of June last whilst reaping our patch of mealies numbers of pale pinkish caterpillars were found in the pith of the cob." (From the technical description given by correspondent, Mr. Fuller says these were the larvæ of the mealie grub.) "Later at Umsinga I kept under observation a small patch of drought-starved mealies, and during the whole of June and July I obtained grubs from these, but not one pupa. On October 5th I examined some mealie stalks here at Tugela Ferry, obtaining several larvae and one empty pupa shell. To-day, 28th October, I examined a native's plot from which a good crop of amabele had been reaped, and from this I obtained a large number of pupæ and larvæ. The pupæ I found in all positions, from the bottom joint of the stem upwards. The larvæ taken at Umsinga were found similarly situated. The fact of their being no green mealies within a mile of the amabele I examined to-day proves beyond doubt that the larvæ do not feed again after hybernation; further I found that the few juicy stalks of imphe had no larvæ in them. Many empty pupa shells that I secured to-day were surrounded by a mass of little white cocoons, each enclosing a small red pupa, from which the insects had already emerged" (Mr. Fuller remarks that this parasite of the mealie grub is not infrequently met with.)

Regarding locusts, Mr. Brookes says:—"The red-wing locust is here, but not abundant. So far none have been noticed *in copula*. I have seen hoppers, which the natives say are 'Intotofianas"; these go about in swarms of 50 to 500, and I have noticed them since April last. About an equal number of each swarm are striped yellow and black and green and black: possibly the sexes are so differentiated at this stage." Writing under date of the 19th November, Mr. Brookes adds that of the 20 pupæ of the mealie grub under his observation the majority have emerged as moths. The first moth was found upon the morning of the 2nd November.

Watering Sugar Estates.

In the *International Sugar Journal* for September appeared a statement that "some recent attempts have been made in Natal to simulate rain by means of water squirted overhead," the *Journal* adding that, according to an engineering paper, "very successful attempts have been made with a machine working on the fire-engine principle sent to one of the Natal sugar estates by Messrs. Gwynne, the pumpmakers, of Hammersmith." Proceeding, the *Journal* says: "The equipment consists of a powerful petrol tank on which there is mounted a high-pressure centifrugal pump. This pump can be coupled direct with the engine, and is capable of delivering 250 gallons of water per minute against a pressure of 75 lbs. per square inch. The two delivery branches are connected with ¾ in. nozzles, and will produce jets of water 120 ft. high. The machine can also be used as an agricultural tractor, when it will haul a three-furrow plough or any other implement, or drive a 4 ft. 6 in. threshing machine. In working order, the vehicle weighs about 2½ tons. The tractor, by Messrs. Dennis Bros., of Guildford, is provided with a gear box, having three speeds forward of two and a half, five, and ten miles an hour, and a reverse gear controlled by a lever conveniently placed near the driver. The road wheels are of wrought steel, with cast steel hubs and cast-iron bushes, giving large wearing surfaces. The rear wheels are 10 inches wide, with diagonal steel strips, and are so arranged that an extra widening ring can be quickly attached for use in exceptionally soft ground. The total width of wheel is then 14 or 16 inches. In addition, angle-iron spuds or grips can be fixed to give the necessary hold on the ground for traction purposes."

On reading this announcement we communicated with the leading sugar estates on the Coast, with a view to ascertaining which particular estate had taken this interesting step; and we were particularly interested in the statement that "machine can also be used as an agricultural tractor, when it will haul a three-furrow plough or any other implement," etc. We eventually got into touch with the estate concerned (we have-

not had permission to mention the name of the estate, but may say that it is a large one on the South Coast), but we learn that, although the plant in question has been ordered, it has not yet arrived in Natal, so that the statement that "very successful attempts have been obtained" is hardly correct if it be understood to mean that the attempts have been made in Natal actually. The manager of the estate which is importing the plant has kindly promised to communicate with us again as soon as the plant arrives and practical tests have been made, and we will thus probably be enabled to publish an article on the subject in due course.

Drying Maize.

Discussing the ripening of maize, in its issue of the 4th September the *Louisiana Planter* refers to the practice adopted by many large maize growers in the United States for the purpose of forcing the drying of corn. "They go through the fields with a stick and hit the corn stalk just below the bottom ear [cob]. This bends the upper part of the stalk with its one or two ears so that it will fall downward. This will better protect the ripening corn from rain and from the birds," our contemporary remarks, adding that "the motive in bending the stalks in this manner is to break up or stop the circulation of moisture in the plants and thus force the drying of the cobs."

Destruction of Moles.

In a recent issue of the *Journal* we published a short article on the subject of mole destruction, in response to inquiries which had been made by readers. We have now received a leaflet from the Agricultural Experiment Station at Lincoln, Nebraska, on the same subject, which contains some further information which may be found of use by those of our readers who are being troubled by the depredations of moles in their fields. As effective and at the same time comparatively inexpensive methods of combating and destroying pocket gophers (whose habits resemble very closely those of moles), the writer of the leaflet suggests the following in the order of their importance and effectiveness.

TRAPPING.—This is perhaps the safest method, if not the quickest one, of getting rid of pocket gophers, etc. By setting steel or other traps in conformity with the habits of the gopher when working in his burrow, *i.e.*, by getting them far enough down in the main runaway so as to insure the animal's crossing the trap when coming to close up the opening, the trap will be sprung and the victim secured. There is very little difficulty in catching them after one has had a little experience in placing traps. [We understand that mole traps can be obtained locally—at any rate in Maritzburg.—ED., *Agr. Jnl.*]

POISONING.—These mammals can also be quite readily poisoned. In doing this, a very active poison must be used, as, for example, strychnine or cyanide of potassium, and this must be placed in the main runways below the surface by dropping the bait through openings made with a dibble of some kind. This opening should then be covered over. Poisoning should never be done by throwing the bait into the mouth of an open burrow, as the animal is very apt to push the poison out along with a load of dirt, and in that way endanger the lives of various farm animals. Poisoned raisins or pieces of potato or apple may be dropped into the main runways with excellent result. In employing poison for the destruction of moles great care is, of course, always necessary so as to avoid all possible chance of poison to the operator as well as to everything else not intended to be killed.

BISULPHIDE OF CARBON.—"Some persons have reported success by the use of this substance," the writer of the leaflet says, "but our personal experiments have not been at all satisfactory when trying to kill gophers with it. The animals seem to scent the danger and plug up their burrows and thus escape. It might answer well in short burrows, but sometimes . . . the burrows are long and would require an immense amount of fluid to be effective."

Quibell's Patent "Cattle Washer."

This apparatus, for which Messrs. W. H. Griffin & Sons, P.O. Box 272, Maritzburg, are the agents, is intended for the use of owners of more than ten, but less than about 100 head of cattle. Above this number it would be more economical to erect a full-sized plunge dip. The idea which is embodied in it is, that in place of laborious and unsatisfactory spraying, whereby the underparts are frequently only half wetted, the animal in this machine stands with the whole of the underparts completely immersed in this dip. With a hose of sufficiently large diameter the wetting of the upper parts is a simple matter. To train fresh animals, it is well to walk them through the empty tank three or four times, then let in say a foot of dip and walk them through again. One man works the pump above while another, manipulating the hose, carefully washes or hoses down the ox, working always from behind against the set of the hair, and finishing off by washing out the ears and over the face. After all the animals are finished, the store tank lid is opened and the nozzle inserted; the whole of the dip can then be returned to the store.

The following description of the tank has been furnished us by Messrs. Griffin & Sons, and will probably be read with interest by stock farmers:—The tank can be built of any available materials, since between

dippings it stands empty. The maximum depth below the ground line is 3 feet 6 inches, and the stand at this depth is 4 feet long, being raised 4 inches at the gate end. The horizontal length of the entrance and exit are each 10 feet. Splash boards should be erected along the sides to a height of at least 18 inches. The maximum width need not exceed 3 feet at the ground line, and should not be more than 1 foot at the bottom of the stand, in order not only to economise the dip, but to discourage undue activity on the part of the animal. From either end of the four foot stand, the tank should taper to the ends down to 2 feet 6 inches. To one side of the entrance, and close to the tank, is a platform on rough poles, about 12 feet high and on these is mounted a cheap 2-inch lift pump which draws its supply from the deepest part of the dipping tank. The pipe for this should be led in from the side underground, and should come flush with the walls, so as not to catch the animals' feet. The pump delivers into a barrel or drum, on top of which is any available strainer, such for instance as a piece of No. 10 wire mesh twisted into a cone. At the bottom of this barrel is fitted a piece of canvas hose, 1¼ or 1½ inch diameter, and fitted into the end of this to serve as a nozzle, is a short piece of iron gas pipe 1 to 1½ inch diameter. The hose should not be less than 18 feet long. At the forward end of the dipping tank is fitted a gate, made to open outward, the bottom of which should about touch the water when the latter is say 3 feet deep. The gate is hinged to a strong post driven beside the tank, and closes to a similar opposite, and catches there by an iron bar or bolt. The object of the gate is to discourage the cattle from jumping the length of the tank instead of walking through. When in place, a slip rail should be pushed in behind the animal, or the rail may be hinged to fall into a groove. A draining pen large enough for five or ten head should be provided for at the exit, and gutters should lead into a sump, the overflow of which back into the dip, should be provided with a gate to catch foreign matter. Under or near the pump is placed an ordinary standard 400 gallon tank, and this should always be made up full when the dip wastes down to exactly 300 gallons by measure of gauge, *i.e.*, mix another 100 gallons at same strength and fill tank, thus the standard strength of the dip will remain unimpaired. The storage tank is fitted with a watercock and short length of pipe.

Do not feed too much hay to your horses. Better to give a little more grain than to overload your horses with this coarse stuff. A horse could starve to death on hay.

The International Road Congress, Paris, 1908.

By J. F. E. Barnes, C.M.G.,
Chief Engineer, P.W.D., Natal.

Through the good offices of the Consulting Engineer I have received a publication written jointly by G. Montagu Harris, Secretary to the County Councils' Association, and H. T. Wakelam, M.Inst.C.E., County Engineer and Surveyor of Middlesex, descriptive of the First International Road Congress, which was held in Paris in 1908.

The work is published by Wyman & Sons, Ltd., Fetter Lane, London, E.C.

A perusal leaves the conviction that, though good work was done, much yet remains for future conferences to consider and to decide upon. This view of the matter is reflected by the following quotations from Chapter XXIV.:—

"It cannot be said that any universal panacea was arrived at as the outcome of the resolution adopted; nevertheless, the Congress was able to lay down some definite rules which will enable the technical experts to give roads a greater resisting power against the injuries caused by the new methods of locomotion. Under these circumstances, it is clear that a certain time must elapse before the results arrived at can be actually realised and put into effect, and that a second Congress must be called to confirm and verify the principles laid down in the first. Moreover, since tests on roads necessarily require a long period before their effects can be properly estimated, it may well be that no complete solution can be found until a certain number of Congresses shall have been held.

"It follows from these considerations that it is fully recognised that there would be great advantages in the establishment of a permanent Commission which would centralise the results of studies and experiments made throughout the world and would make the arrangements for full meetings whenever necessary."

It is satisfactory to note the establishment of "A Permanent International Commission of Congress with the object of furthering progress in the construction, maintenance, traffic and working of the road, and also for providing in future for continuing in the work of the Congress," it was approved, moreover, "that the Permanent Council is charged with the organisation of the next Road Congress which will be held at Brussels in 1910."

Meanwhile, *inter alia*, it will be the duty of the Permanent Council to consider the centralisation of the results obtained from the various

experiments made in all countries and if necessary to cause fresh experiments to be undertaken with a view to fixing standards, particularly of tar and other substances and for materials of construction, including steel, cement, etc.

The first Congress was convened by the French Government, who invited all nations to take part. 2,250 persons, representing 27 different countries, responded. Of these Great Britain sent 126, made up largely of county and borough surveyors. The representative of the British Government was Mr. H. Percy Boulnois, M.Inst.C.E., Deputy-Chief Engineering Inspector of the Local Government Board, while the delegate of the Irish Local Government Board was Mr. P. C. Cowan, B.Sc., M.Inst.C.E., Chief Engineer to the Board

The United States of America had a representative.

There were nineteen French official delegates representing the Departments of the Interior, Foreign Affairs, Commerce and Industry, Colonies, Public Works, etc., while Germany and Belgium each sent ten, but apparently there were no representatives from India or the British Colonies.

EXHIBITS

embraced interesting specimens of road appliances, steam rollers, tarring machines, road plant, sweepers, etc., specimens of various classes of pavements and of road construction were visited and inspected, as were also specimens of chemically treated wood block as comparison with blocks creosated under pressure.

The number and variety of tar painting machines pointed, it is remarked, to the fact that "a great call for such machines was anticipated," while as regards steam rollers, it is mentioned that during the Exhibition an English firm secured orders for no less than sixty-eight rollers.

The straight, practically level, paved, asphalted or tar painted city roads of France have but little practical interest for us in Natal where the circumstances respecting gradients, traffic, and, above all, expense, are so widely different. As, for example, the *upkeep* of a section of the Bois de Boulogne about one mile in length in 1905 was £1,000, in 1906 £1,400, and since 1906 that length had been twice tarred at a cost of £200. Speaking, however, of a visit to Versailles it is remarked that "the roads on the outward journey within the City limits and through the Bois de Boulogne were in a fair state of repair, but outside the City gates they were very poor indeed both in section and condition. At St. Cloud the *Route Nationale* was struck and traversed to Versailles. The camber of the route was very considerable compared with the English practice, being in many parts as much as one in twelve from the crown of the road to the channel. At Ville de Roy the abnormal transverse section of the road appeared to be positively

dangerous to the traffic. Quartzite and poryphre appeared to be the chief materials used for metalling the roads, the former being in all cases in a much better condition than the lengths maintained with the latter material," and again, referring to outlying places, the following extracts are worth quoting:—

"The road towards Choisy-le-Roi is raised several feet above the land level, and is supported by banked slopes without fencing of any kind. Following the route for two or three miles, the town of St. George's was reached ,the main street and footways of which are paved with granite setts of a kind similar to those in use in and about Paris. The carriage way was very narrow, and in appearance it looked neither well-cared-for nor yet presented a creditable appearance from a reparation point of view.

"Following the *Route Nationale* through Montgeron the first tar-painted length of carriage-way was reached. There was no traffic on the road, which was lined with the well-grown trees so commonly seen along the roads of Continental countries. Past Croix Villa, the *Route Nationale* was kerbed with stone on both sides, which kind of edging extended for many miles, and which, with the absolute straightness of the routes, the continuous complete avenue of trees, and the forest, causes the journey to become both tedious and monotonous.

"No hedges exist along the roads as in England, and side roads are, in most cases, many miles apart.

"The condition of the tarred sections was infinitely better than that of the lengths untarred, the latter, in many places for considerable distances, being in an extremely poor state of repair.

"About three hundred members of the Congress were conveyed to Nice from Paris by special train on Sunday, October 18th.

"On Tuesday, the 20th, the delegates were taken to view the wonderful serpentine mountain roads of L'Escarene and L'Anthion. These roads have gradients of about one in ten, with exceedingly sharp curves, the latter having no proper banking-up on the usually super-elevated parts. It was with great difficulty that the heavily laden cars, in which the party were conveyed, manipulated the sharp twists and curves. The metalled surfaces of the roads had a width of about sixteen feet, and were in a fairly good state of repair.

"On Wednesday, the 21st, the party went for an excursion by the Corniche road to La Turbie and Monte Carlo, the roads traversed having been built by Napoleon I., and since much improved. They were in a good condition from Nice to La Turbie, but from the latter place to Monte Carlo the surfaces were not so good. The dust nuisance made itself felt along this stretch of country, in which attempts had been made to carry out surface tar-painting, but with little success.

"At Nice a length of road was under construction in what is

termed locally 'armoured' asphalte, the cost of which was stated to be about 13s. per square yard exclusive of the foundation of concrete."

As to

ADMINISTRATION

it appears that in practically all the European countries (*viz.*, Spain, Italy, Holland, Belgium, Austria, Saxony and Norway) their roads are dealt with by Central Government Departments. This is also the case in India. The roads of England alone are, on the other hand, under County, Town, and District Councils; totalling 1,896 in number. Those of Scotland under 222 County and Burgh Councils, and those of Ireland under 373 County and District Councils, County Boroughs, etc., without any central supervising or intelligence department.

In France, Spain, Italy and Belgium, there are national organisations of road men.

The opinion that England should give up her "exceptional position in this matter is expressed in a paper which points out that the matter of roads in Great Britain is too vast for any parochial or county body to undertake. The roads, and most urgently the main ones, must be placed under a central authority. Some anomalies which would thus be avoided are:—

(1) "At present the roads of a district are probably most used by non-residents, who 'wear' the surfaces but do not contribute towards the upkeep.

(2) "Experiments cannot be undertaken, even by a county authority, with any sense of financial equity to the ratepayers.

(3) "Owing to the absence of suitable road-making materials in many districts, the cost of constructing highways varies to a great degree.

"Therefore, says Mr. Hinde, the author of the paper, it seems as though we are forced to the conclusion—both on the grounds of equity to the ratepayers as well as of securing the best results—that the whole subject of roads should be regarded as a national one. Latterly the British Parliament has shown some interest in town planning as opposed to the haphazard way in which English cities have been developed. Similarly, the question of road planning will have to be considered by a central Government department, the functions of which might include:—

(*a*) "The establishment of a bureau of information concerning the practice of other countries with regard to the construction of roads.

(*b*) "The collection of data with reference to new road material, the compilation of records as to the behaviour of various types of road, and the classification of material in order of utility for special conditions.

(*e*) "The organisation of a department for providing machinery and equipment for districts where—as in Ireland—steam rolling and other modern methods have had to be disregarded on the score of expense.

(*d*) "Working in conjunction with the Ordinance Survey, a road plan of the county should be prepared, with a view of straightening roads that at present are tediously zigzag in form, securing short distances instead of roundabout courses between important towns, and advising with regard to proposed new roads and highways.

(*e*) "Undertake the maintenance of all main roads, and so secure a desired uniformity in surface and construction.

(*f*) "The encouragement of experiments likely to serve the national purpose.

(*g*) "A general liberty of action with regard to subjects coming within the category of roads."

The necessity for easy camber of road is called attention to particularly in respect to motor traction, as is also the necessity of rolling the subsoil before laying materials of construction.

On page 41 Mr. R. J. Thomas, M.Inst.C.E., county surveyor, Bucks, and delegate of the Association of County and Municipal Engineers, points out that "very few English country roads have either rubble or hand-packed foundations; that the majority are carried by layers of small stone in varying thickness laid upon the subsoil, following the Macadam rather than the Telford principle of construction. The latter did not always carry out what he advocated, *viz.*, a hand-packed foundation," and as an example quotes Telford's noted Holyhead Road, which where opened up for reconstruction in Carnarvonshire, possessed no hand-packed foundations.

I may say here that this fact I am much pleased to note, as my own experience and practice for many years have lead me to abandon the Telford system, not only on the score of cost, but also because undoubtedly Macadamising gives better results. Telford's foundation-paving *invariably* works up to the surface in a few years. The metalling and binding material finds its way to the bottom, where it is, of course, useless. A rough and unequal road is the result.

As a local example I may state that in 1882 in taking up the appointment of Borough Engineer, Durban, I found the Umbilo Road being constructed under contract by Mr. Shires to a specification based on the Telford system. Half the work, or about two miles, had already been finished. The hand-packing and all else had been most carefully and conscientiously done. Acting on experience gained in the north of Ireland during the ten previous years, I at once altered the contract specification, and the remaining two miles of the Umbilo Road were

finished on the Macadam system. Since then, both as Borough Engineer and after, I had the pleasure of seeing the incomparably better results obtained by the Macadamised portion to those of the Telford. The former wore evenly and gave but little trouble, while on the latter, the foundation so persistently worked to the surface that within three years of its being constructed, I had to send a gang with sledge hammers over the Telford two miles to *break down* the projecting paving stones.

In support of these views it is satisfactory to note that the present Borough Engineer, Mr. Fletcher, the excellence of whose roads speaks for itself, also follows the system of Macadam.

In practice the Telford system should only be adopted in special cases where a faulty natural foundation requires to be artificially remedied. Moreover, the cost of a Telford-built road is nearly double that of a Macadamised road.

On the subject of *cost,* the Congress report furnishes useful and interesting figures. A list of the comparative cost of road maintenance in various countries is as follows:—

Country.	*Mileage.*	*Total Annual Expenditure.*
England and Wales ...	149,759	£13,495,204
Scotland	24,615	1,220,503
Ireland	54,064	1,174,941
France	23,820 (Routes Nationales)	1,224,588 (Routes Nationales)
Spain	23,720 (High Roads)	1,479,313 (High Roads)
Switzerland	—	434,155
Austria	10,018 (Imperial Roads)	673,970 (Imperial Roads)

These figures give the average annual cost per mile of road in

	£	s.	d.
England and Wales as	90	2	0
Scotland as	49	11	6
Ireland as	21	14	6
France as	51	8	6
Spain as	62	5	0
Austria as	67	5	6

Taking the average of these six countries as fairly representing that of Europe we get the cost per mile of road at £57. That was for the years 1905-6, since when the rate has considerably increased.

In England and Wales the average cost to the counties for roads reparied by *Urban* District Councils was £226 per mile, and by *Rural* District Councils £69 per mile.

A list taken from the Local Government Board returns for the year

ending 31st March, 1906, gives the *mileage* of main roads directly maintained by the County Councils (practically rural roads only) and their annual cost per mile. Of the 50 items given, I take the following 20. The *least costly* of English counties are:—

Huntingdonshire	£38 per mile	*Least costly,*
Norfolk	38 ,,	
Salop	47 ,,	
Rutland	50 ,,	
Cumberland	52 ,,	

Then we have—

Berkshire	£68 per mile	*Medium,*
Staffordshire	77 ,,	
Northamptonshire	83 ,,	
Derbyshire	88 ,,	
Worcestershire	99 ,,	

and—

Monmouthshire	£104 per mile	*Amongst the Highest;*
Cheshire	107 ,,	
Essex	137 ,,	
Kent	151 ,,	
Durham	168 ,,	

while for Middlesex the figure is £556 per mile.

In *Wales*:—

Merionethshire	£18 per mile	*(the lowest)*
Pembrokeshire	53 ,,	*(medium)*
Glamorgan	202 ,,	*(highest)*

As examples of urban main roads seven are given. Of these the extremes are:—

Devon, with practically no through traffic, is the lowest. 248 miles cost £83 4s. 2d. per mile per annum.

Kent, adjoining London and with much traffic to the coast but not to other counties. 148 miles cost £409 3s. 9d. per mile per annum.

As to

COST OF CONSTRUCTION,

reduced to English pounds and miles:—

For France the normal cost is £825 to £1,650 per mile. In hilly country it will amount to £2,550 per mile. For secondary roads—in level country, £385 to £825 per mile, and £825 to £1,375 per mile in the mountains. For the smaller roads £275 to £330 per mile.

As, however, the conditions of America may be considered to more nearly approximate to those in Natal than do European countries, the following records from page 73 of the report are of interest:—

The area of the United States of America, excluding Alaska and island possessions, is 2,970,038 square miles. In 1904 the road mileage was 2,151,570 miles. Of this great mileage, 155,662 miles (about 1-14th) only were improved. Of the mileage improved 108,232 miles

were surfaced with gravel; 38,621 miles, or less than 2 per cent. of the total mileage, were hardened with stone; while 6,809 miles were made of sand and clay mixtures, oil, shells, etc. Since 1904-5 the office of public roads of the United States Department of Agriculture has been assisting local bodies in various parts of the States to build short sections of roads as object lessons.

In 1908 the average cost of roads in the Pacific States, with Macadam surface 15 feet wide, was about £1,550 per mile, or about 3s. 6d. a square yard. In the Western States the average per square yard was 2s. 9d.; in the Northern States the average per square yard was 3s. 1d.; the formation being from 8 inches to 9 inches deep. The average rate works out at 3s. 1 1-3d.

Now to apply these costs to Natal, it was only last year that one of our leading papers compared Natal roads to those of Kent, to our disadvantage, of course. But considering that the rate per mile for the upkeep *and* improvement work on Natal roads is barely £10 a mile, while Kent spends £151 per mile, it will I think be readily admitted there is no room for comparison.

As compared with American cost of *road hardening,* 3s. 1 1-3d. per square yard, and which is cheaper than that of European countries, Natal again comes *easily* first, as our rates for macadamised and steam rolled roads are *well under* 2s. per square yard. (See my annual reports for the past and previous years.)

As I have many times advised in my annual reports, it is to the interests of Natal to push on with her road improvements now, while these low rates are obtainable. Certain it is that they will not always be so. The fact that such work costs us less than other countries is a matter for congratulation.

The Conference strongly favoured the application of tar on public highways. To bring our macadam roads up to date and fit for motor traffic it only remains for the making of tar to become an established industry in Natal based on rates satisfactory alike to manufacturers and purchasers, and we can then easily afford to *tar paint* our finished roads, thus adding to their life and to the comfort of travellers.

That road improvement is now more than ever necessary, owing to the altered condition of road transport due to Tick Fever, is self evident. Every farmer now, more than heretofore realises the advantage of a hard road surface and easy gradients.

It is only to be expected that motor traction will ere long demand, even better roads than those which suffice for horses, mules, or donkeys, but while admitting the equity of the demand, it must not be forgotten that in order to render such improvement possible from a financial point of view, motor traffic must submit to restrictions considerably greater than those now existing, *i.e.*,

(*a*) Speed must be limited;

(*b*) Wheels must be more suitable for and less harmful to the road surface;

(*c*) The weight of the tractor when employed in hauling trailers and the load so hauled, must be limited to a reasonable weight per tractor wheel, or better still, the use of traction systems of the Renard Road train type should be encouraged.

As to the direct bearing of increased motor traction to increased maintenance cost, the following figures from page 114 are eloquent:—

"The cost of the roads in England and Wales has steadily risen during several years, partly by reason of the demand for a higher standard of road surfaces to meet the new forms of locomotion and the general expansion of all kinds of traffic. At present there are about 8,500 traction engines in England and Wales, which necessitate the provision of stronger road surfaces and foundations with a corresponding increase in maintenance. Since 1896, when the use of automobiles was legalised, their number has steadily increased and correspondingly to their growth the main roads' bill of England and Wales has also increased, as the following figures will show:—

Year.	Motors.	Rate of cost of road maintenance per mile.
1904	51,549 ...	£86·9
1905	74,058 ...	£87·9
1906	86,536 ...	£90·7
1907	125,320 ...	£91·8

"In 1901 the average rate per mile was but £76 1s.

It is averred that, apart from any further increase in motor traffic during the next few years, *extra* expenditure will be needed to repair the damage already caused to the roads and not yet made good. It is stated that the effect of automobiles has been to greatly increase the necessity for an improvement in the quality of the metalling spread on the roads. The cost of abandoning the flints, gravel and limestone surfaces of the 4,500 miles of main roads now coated with these materials out of the mileage above given for England and Wales and providing them with coats of basalt or granite would be about £5,000,000, which expenditure can only be gradually undertaken.

"A chief cause of the unusual damage caused by motor traffic is attributable to the defective design of the wheels, and the damage is increased where the *wheel* is the medium of *motive power.*"

It is particularly remarked that the roads have suffered greatly from the small diameter wheers of the commercial motor, while the armoured wheel tire has proved to be a "potent instrument of road destruction."

"The teaching of Morin and others demonstrating the saving gained by the employment of *large* wheels in reducing resistance to traction, have been ignored by those responsible for modern vehicles, with the result that much damage is being caused and a serious financial burden is being placed on the shoulders of the community by reason of the wheel of the automobile being far more destructive than anything hitherto seen on the roads."

For automobiles a maximum speed not exceeding 25 kilometers (about 16 miles) per hour, and for heavy industrial motors 15 kilometers (9½ miles) is recommended, the *average* speeds in each case to be about one-third less. The heaviest axle weight not to *exceed* 5 tons nor 840 lbs. per inch on tires. The driving axle to have metal tires provided these have smooth faces.

RENARD ROAD TRAIN.

Special attention was called to the Renard Road Train as being the system to which we must look for reducing the cost of maintenance, as by it alone is the propelling stress divided over the entire train."

With this opinion I am in complete accord. The injury inflicted by the traction engine greatly detracts from the value of the ordinary tractors.

The adoption of motor traction throughout the Colony in a haphazard manner and without preparation cannot be thought of. That which must be done is:—

(*a*) To make selections of the more useful roads those preferably which are feeders to towns and railway stations in districts not provided with railways;

(*b*) On such selected roads, gradients must be reduced and at least all inferior portions hardened or macadamised. When this has been done a proper system of traction should be established, preferably under district control, though possibly subsidised by Government.

It has just been shown herein that to macadamise 4,500 miles of roads in England and Wales is estimated to cost £5,000,000. That mileage, together with the 500 miles already hardened in Natal, would very nearly complete the roads of the Colony, but the cost estimated at but *half* the foregoing, would amount to the enormous expenditure of £2,500,000.

Assuming, moreover, that this large sum were forthcoming, so great an extent of macadamising or hardening could not be carried out in any limited number of years. That, however, which could, and I consider should, be done is to lay down a permanent policy whereby from year to year £10,000 to £20,000 or some such reasonable amount, could be

set aside for road improvement work quite apart from maintenance. In this way material advancement would be brought about in a few years.

It must never be forgotten that Natal is an extremely broken and hilly country abnormally well watered by numerous streams and rivers. These conditions though they have their advantages, give rise to expense when it comes to the question of road making and maintenance. But again in this connection, while our neighbouring territories with their flat countries can afford to take matters easily as regards road making, the conditions as regards Natal are all the reverse.

I have shown how favourably the cost of our road work, both "construction" and "maintenance," compares with similar work in other countries, and that this being so Natal's policy should be to steadily harden and improve her roads while those conditions exist. They will not last for ever.

A circular for teachers, containing information in connection with school gardens, has been recently issued by the Superintendent of School Gardens in Ceylon. This information includes particulars of the objects of school gardens, which may prove of interest to some of our readers. The objects of school gardens are stated to be:—(1) To brighten the surroundings of the school, and make it what it ought to be, namely, a pleasant resort for the boys and not a bare and unattractive building; (2) to lighten the routine of class work by varying it with outdoor work of a recreative nature; (3) to exemplify order, form, neatness and good taste in the laying out of the premises; (4) to furnish a field for nature study, *i.e.*, the study of natural objects in their natural surroundings; (5) to serve as object-lessons in horticulture, *i.e.*, the cultivation of useful and ornamental plants; (6) to give a practical turn to school life, and provide a training in elementary agricultural science; (7) to serve as centres for the dissemination of seeds and plants, and of information concerning them; (8) to be mediums of communication between the agencies that aim at the improvement of agriculture and the cultivating classes; (9) to induce the cultivator, directly or through the schoolboys, to take up new and improved products, and to adopt better methods of cultivation; (10) to awaken in school children a new interest in the cultivation of plants, and to instil into them a love of nature, and so reconcile them to a country life and to agricultural pursuits; (11) to encourage school children to establish gardens at their homes; (12) to make schoolboys take an honest pride in manual labour, and to induce a healthy competition among them as well as between one school and another.

The Living Bee.

By MARY RITCHIE,
President, Natal Bee-Keepers' Association, Natal Expert, South African Bee-Keepers' Association.

INTRODUCTION.

"Biology for men and women is not what they teach at College, but watching *the living bee.*"

THE old naturalist theory that bees in warm countries do not store honey, having no winter to provide against, has been entirely disproved by practical bee-keepers within recent years. In America and Australia comb-honey is sold by the car-load and extracted by the ton. That similar harvests await scientific bee-keepers in South Africa is not unlikely, but so far honey must be classed as one of the "sample" products of the country. It has been proved, however, that honey can be produced in South Africa that in appearance and flavour will bear comparison with the finest "extra grade fancy" of other lands.

That there should be so few bee-keepers is not the fault of the country—a country in which one can practically live in the open air—or of its bees. Hundreds of wild swarms have their homes in the kloofs. From early spring when the bush trees blossom, through the heat of midsummer, the bees are busy, on until the autumn when the last veld flower withers and the grass is burnt and bare. The honey is stored for the most part in lonely inaccessible places in the cliffs—sometimes resulting in magnificent honey "takes" and sometimes robbed by the natives and presented for sale at the white man's "kia" a woful mixture of honey-comb, bee-brood dust and pollen. A native umfaan in the honey season "all over stick" is a sight not readily forgotten. Like other small boys he likes honey; he sucks it greedily, beaming happiness, a bee stings him, he rubs the place with his sticky hands, the red mud adheres, and soon he is honey, mud and dust over head and ears.

In many places there is an abundant harvest from wild flowers alone, but everywhere, with advancing cultivation, forests and orchards are taking the place of thorn-veld and scrub. Numberless fruit trees have been planted and much of their sweetness remains ungathered every year. Through the warm spring dusk comes the perfume of the orange blossom, the sweet honey scent of the loquats, the fragrance of the mango, from thousands of blossoms brimful of sweetness, waiting for the bees.

In other countries no picture of a rural cottage is complete without

its row of skeps at front or gable end. They are suggestive of security and peace, they speak as surely as the ivy that curtains the windows or the honeysuckle that twines among the roses on the porch, of days and weeks of quiet sunshine. We feel sure the inmates as they go out and in never fail to watch the bees, and note through them the progress of the year. For by their flight they mark the first spring day, their joyous hum proclaims the apple trees in bloom, the drones loud buzzing is a very part of the indolence of summer, while the workers' eager journeyings suggest the sweetness of the honeycomb, the deliciousness of new brown bread, the scent of apples, and all the joys of harvest time.

This air of settlement and peace is lacking in the new Colonial home, and, comparatively speaking, all Colonial homes are new. There are colours only time can tone and things that only time can bring. In a new country like South Africa changes are more likely, absence and even desertion of the homestead, all may be sold at such times, even poultry disposed of, but—bees! This question of a really settled home is doubtless one of the primary reasons why bees have not received in this country the attention which they deserve, and which one might very naturally expect them to receive in this sunny land.

An old-time writer remarks that if gentle-folks only knew the pleasure to be derived from keeping pigeons no house would be without its loft. If gentle and simple folks only knew the pleasure of keeping bees no house would be without its hive.

And not only for pleasure might bees be kept but for profit also. A ready market awaits the producer of comb and extracted honey in South Africa and at higher prices than anywhere else. Eggs are scarce in this country but *honey* is scarcer.

South Africa can never be a great fruit-growing country without being a bee-keeping country as well. We are dependent upon the bees for the pollination of most of our fruit. This is easily proved. Net the branch of a fruit tree just coming into blossom that no bees may visit it, and no matter how glowing the sunshine, how plentiful the rain, how abundant the flowers, that branch will bear no fruit. Or chose a healthy strawberry plant, cover it with a fine wire-gauze meat cover and watch it from day to day; the flowers will open as usual but the strawberries will be easily counted.

Before any flower can set seed it is essential that the yellow fertilising dust or pollen should reach its stigma. This was discovered and partially understood more than two hundred years ago, but it was believed for a long time that flowers were fertilised by their own pollen. An old German botanist named Sprengel was the first to notice that the bees had anything to do with it. He watched them humming among his flowers and saw that they were interdependant—hand in glove—

with one another. He noted down what he had seen, summer after summer, and finally published a book called "The Secret of Nature Discovered." But the botanists indoors would not look at it. "What childish tales," they said, "What foolish fables." So it was soon forgotten and lay almost a century unnoticed until another naturalist took it up, and people believed when they read the "Fertilisation of Orchards," by Charles Darwin.

That stone fruits were incapable of fruiting without the bees was first popularly discovered by trying to grow peaches under glass, and again and again it has been proved that not only more but better fruit is obtained from orchards in the vicinity of bees. They are undoubtedly the most important fertilising agents: apple, pear and particularly plum trees are fruitless when deprived of the helpful work of the bees. Realising then what we owe them, it is only right that they should be housed and taken care of. The first gain would be to the bees perhaps—in saving them from the natives—but as the fruit-farmer depends upon the size of his crops, the nurseryman on the quantity and quality of his seed, he has only to understand that there would be neither fruit nor seed were it not for the bees, to realise what an important part they play—or *might play*—in the making of his income.

HOW TO BEGIN.

For the production of honey three things are essential:—1. A good honey flow, as the Americans say, plenty of honey in the flowers. 2. A strong colony of bees in an up-to-date hive. 3. Skilful management.

1. The honey-flow. South Africa to the bees is a land that floweth with milk and honey, and I have already spoken of the ungathered sweets and harvests yearly lost.

2. To buy bees used to be considered very unlucky. "I give a pig and I takes bees" is a Dorsetshire saying. In these days we are more mercenary and less superstitious. In South Africa bees may often be had for nothing, and as they frequently take up their residence where they are not wanted, bee-keepers may actually be paid for taking them away.

A strong colony means about 20,000 bees in a British hive and 50,000 in a large American one. Like the Colonial homestead the hive must grow with the growing needs of the inhabitants; as the bees multiply the capacity of the hive must be gradually increased. Vacant space makes the bees unhappy, and cramping causes them to swarm. Modern hives are designed to be easily enlarged or contracted as needed. Amongst modern hives the American Danzenbaker is one of the most suitable for the country. These and other appliances, costly enough in the past, can now be bought cheaply at Capetown, Maritzburg, or Durban. Besides the bees and hives a text-book is necessary, a smoker,

bee-veil and pair of gloves. The "A.B.C. of Bee-keeping" is excellent as a text-book and for reference, being really the last word so far on the subject; it is also the X.Y.Z. Hooper's "Bee-keeping in Jamaica" is also useful for tropical bee-keepers.

3. The bee-keeper's first task is to see that his hives are well shaded, situated, if possible, under deciduous trees. This is absolutely essential in our hot sunshine, also that they are raised from the ground and safe from ants, which annoy the bees. Hive-covers must be rain-proof not only as a protection against driving rainstorms, but if there is the slightest opening, the bees in their endeavour to shut out the light will propolis and thus dirty the sections.

The alighting boards should be kept thoroughly clean and salt sprinkled round the hives to keep down the weeds. This in the case of the Black-Jack (*Bidens Pilose*) being as much for the bee-keeper's own comfort as that of his bees.

The bee-keeper must be on friendly terms with his bees, not in fear and terror of their stings, otherwise the partnership will be unsuccessful. This friendly relationship does not come after a day or two of acquaintance or even a week or two, but its acquirement is not without a certain amount of pleasure and excitement. Though some bee-keepers work at night it is erroneous to suppose that bees do not sting in the dark. "An infant crying in the night and with no language but a cry" was to Tennyson the loneliest sound to fall on human ears. Another writer speaks of the shivering child-cry of the lamb, but the wail of bees disturbed in the darkness is, if possible, more distressing, more piteous, than any. Between 9 in the morning and 4 in the afternoon is the best time to open the hives. The bees are busy, consequently happy, and the old bees, "the stingers," are out gathering or too full to fight.

But not every day is a bee day. A wet or windy day or a day after rain should be avoided. A bee day par excellence is one that is not only warm but still, and how many long, quiet, sunny days—perfect bee-days—we have in South Africa.

II.—"THOSE BEES."

They are between the iron and the wood; either we must pull the house down or let them remain; there seems no way of getting rid of them. This is a very frequent complaint in South Africa and will be until there are more bee-keepers, or the wood and iron houses so common in this country come to be replaced by buildings of a more substantial type.

The bees, sometimes swarming naturally, sometimes driven from their homes in the ground by grass fires or native plunderers, are forced to seek other quarters. In their quest for new homes they discover a crack or crevice just under the roof of some wood and iron building and

inside a clean rainproof space, with a convenient cross-bar on which to build their comb. Little wonder that, finding such a desirable residence standing empty, they should take immediate possession. Their disillusionment begins when their new landlord looms up large through a halo of sulphur smoke with the avowed intention of making the place too hot to hold them.

As a rule this is no easy task. The bees have settled down and are loathe to face the dangers and difficulties of a second removal, while the householder is too anxious to be rid of them to pay any attention to their little ways. A battle royal ensues in which there is much loss of temper on the one side and on the other thousands slain. For personal reasons a conciliatory policy is best and the bees should be allowed to remain until some one—European or native—with sufficient knowledge or skill can be found to take them away.

There are societies for the prevention of cruelty to animals, societies for the prevention of cruelty to dogs, for the prevention of cruelty to cats, societies for the prevention of cruelty to birds, now our Bee-Keepers' Association has been formed for the prevention of cruelty to *bees*, for surely these wonderful insects deserve to be studied and treated kindly and never ruthlessly destroyed.

Ignorance alone can account for the heartless and needless cruelty so often practised. With increasing knowledge comes a more humane and scientific attitude, suggesting a wiser policy and a very different treatment; one, in short, in which man claims his promised dominion over the creatures.

It is true that according to old-fashioned methods, even where bees were "kept," the securing of the honey-crop meant the destruction of the bees, but modern appliances have revolutionised all this. Up-to-date hives are such that honey can be removed without the fear of stings or the loss of a single bee. It is not uncommon in Colonial homes to find packing-cases transformed into very creditable furniture and things innumerable made of paraffin tins. In the same way an old wine or soap box can be turned into a serviceable hive and its humble origin hid beneath a coat of paint. But in these days of harbours and light railways even this is quite unnecessary. Hives can be imported in the flat at very small cost, supers, section-boxes and all complete. If a thing is worth doing it is worth doing well.

In transferring a swarm from a home of their own choosing to one of ours, our first task is to discover the exact whereabouts of the bees. They may be some distance from the crack or crevice they are using as an entrance. But blow a little smoke between the seams and listen to the patter of innumerable feet, like the sound of falling raindrops. Go on until the uproar leaves no doubt as to their position, then with a stone or wooden mallet tap all round, and especially below the cluster.

Remove the iron as quicky and quietly as possible. The combs may be one behind the other or in one magnificent sheet, built downward for lack of lateral space. The combs revealed, a few minutes must be allowed for the bees to settle down, as the withdrawing of the bolts is sure to have disturbed them. A little smoke will cause them to unite in a tight cluster. Set the swarming box under the cluster, or at least as near as possible, and close by another box covered with a cloth to receive the comb. The more honey there is the more difficult the task will be; on the other hand the more worth doing. A light box or closely woven basket should now be held immediately under the cluster and the soft brown mass of bees brushed gently in. While an expert would secure the queen and put her in the swarming box where she would be instantly followed by the bees, the novice is safer to secure the bees *en masse*. If they are not swept off until tightly clustered the queen is sure to be amongst them.

Should there be no space alongside the combs in which the bees may cluster bees and combs must be removed together. Beginning from the outside comb, cut it off with adhering bees below the honey, which is usually along the top, moving the knife slowly so as not to bruise a bee. Shake the bees from the comb very gently into the swarming box and put the comb in the other box; do the same with the second comb and so on. If every bee is secured the queen is certain to be among them. The honeycomb should now be cut down, but in smaller pieces as it is heavy and more difficult to handle. After all the comb has been removed allow time for the flying bees to cluster, brush this cluster into the basket, and shake in front of the box as before, again making sure of every bee.

To secure the lingerers and those whose affections seem to be divided between the queen and their old home, make a little paper bag in the shape of a filler, the narrow end just wide enough to let in a bee, and insert this in the cover of the swarming box. The bees will find their way in but cannot come out again.

As soon as all the bees are in, the swarming box should be put in the shade and carried as soon as possible and as steadily as possible to the site prepared for the hive, carried by the bee-keeper and not entrusted to anyone else—not even a Kafir. No sudden movement must jar the thousands of quivering little bodies inside, which if carried carefully will cling in wondrous festoons to the cover till the time of their release.

The hive set firmly in place and provided with frames fitted with foundation the bees should be gently emptied out on a white cloth in front of the entrance. As soon as the queen enters the bees are practically hived, so that all eyes must keep a sharp lookout for her. As John Burroughs says, "It is an event to distinguish her amid the mass of

bees; it awakens a thrill. Before you have seen the queen you wonder if this or that bee which seems a little larger than its fellows is not she, but when you once really set eyes on her, you do not doubt for a moment. You *know* that is the queen, that long, elegant, shining, feminine-looking creature can be none less than royalty!"

A frame of uncapped brood may be given from another hive or a sheet from the comb-box, fitted in a frame. This will give the nurse bees employment and satisfy the queen—as mothers with babies must needs stay at home. The hive should then be left unopened for at least four days.

One's first swarms are always the most exciting—such novel situations and unexpected happenings. To transfer a stock from a building to a hive and have them all quietly settled in their new home within an hour is tame compared to those early adventures, when we made mistakes and worse remedies, when the bees behaved so differently from all the bee-books said and we paused baffled and bewildered while the hours slipped by like minutes, and we knew by the shadows it was four o'clock and all too soon it would be sunset.

Formerly, the difficulty of hiving the bees was only surmounted by the difficulty of keeping them, but since the indention of the Alley Queen and Drone Trap, that disappointment is nearly a thing of the past. Made of perforated zinc and attached to the front of the hive, it allows the bees free access out and in, but traps the queen should she seek to abscond.

It pays to keep a few buckles, straps, etc., on hand to mend the harness when needed. It will do no harm to have these things on hand even if they are not needed. It is always well to have them when they are needed. Having them may save a trip to town when there is no time to go.

The giving of salt to cows is one of the little things that is apt to be neglected, and a handful once a week is a too common practice. One of the most successful dairymen in the country feeds his cows four ounces of salt per cow per day, and says it pays. "The cow," he says, "gives more milk, the milk has a much better flavour and will keep considerably longer." The salt is fed with the grain ration.

Swine Husbandry and Bacon Production.

By Loudon M. Douglas,
Lecturer on the Meat Industry, College of Agriculture, Edinburgh.

From day to day the evidence continues to accumulate showing that the bacon markets of the world are hopelessly disorganised, and that in so far as swine husbandry is concerned, we are passing through a critical time. It is in fact a curious state of affairs and calls for special comment not only from all who are interested in the prosperity of agriculture, but from those also who are specially concerned with securing steady markets in the provision trade. Apparently the shortage began about the beginning of the present year, and has been more especially marked in the United Kingdom, but it exists also in the United States, Canada, and Denmark, these being the principal bacon curing countries of the world. In the United States the outlook is indeed a serious one, not only for that country itself, but for the export trade. Actual records show for example that the number of hogs packed, on what is known as the Western Markets, and which include Chicago, Kansas, South Omaha, St. Louis, Cincinnati and other towns of the number of sixteen, as also smaller towns in the same territories, exhibit a very considerable shortage as compared with last year. From 1st March to 1st September in each year the figures were as follows:—

Number of Pigs Packed on Western Markets, U.S.A.	
1908	12,975,000
1909	11,735,000
Shortage	1,240,000

This is only one feature of the situation which now looks very black indeed owing to the estimated shortage which is likely to occur in the corn crop. The Agricultural Department of the United States estimated early in the present year, in the month of July, that the corn or maize crop would amount to 3,300 million bushels. Since then, however, weather conditions have upset all the calculations made, and it is anticipated that the crop will not now be more than 2,600 million bushels. As hogs are fed principally on maize in the United States this means a considerable falling off in the food supply, which is bound to react on the breeding of swine. Hence it is that future deliveries of bacon and hams are being contracted for at prices far beyond anything that has been known to the present generation.

This condition of things affects us in the United Kingdom in this way: the imports of pig products for 1908 from the United Statse into the United Kingdom were as follows:—

	Cwt.
Fresh Pork	135,152
Salted Pork	67,438
Bacon	2,541,945
Hams	900,795
	3,645,330

Since January 1st of the present year, however, there has been a steady falling off. Thus, at Liverpool and the Mersey ports, there was a decrease in the imports of boxed meats up to 30th of August last which compared as follows:—

Boxed Meats Received at Mersey Ports.

	Boxes.
1908	511,100
1909	397,900
Shortage at Mersey ports	113,200

The imports from Denmark and Canada have also been short, and reports from both of these countries indicate that it will be impossible to increase the output for a long time to come.

Naturally, such a condition of things has affected the prices of bacon, and, as a consequence, at the moment we have phenomenal prices being realised throughout the country, and there is every indication of these going yet higher. Canadian bacon is quoted at 73s. to 76s. per cwt., Danish at 76s. to 79s., Irish at 74s. to 77s. These are wholesale prices, of course, and represent the values on the exchange for large quantities. After sales have been made on the basis of these figures, several other intermediate handlers have to secure a profit before the counter of the grocer is reached, and the consumer then buys at a retail price. But these wholesale prices are far beyond the normal: 60s. per cwt. would be a fair average price for home bacon, now there is some talk of prices exceeding 80s. and even going up to 90s. per cwt. As has been said, it is a curious situation, and is the result of a continuation of circumstances such as has never happened before. For years back the average import of pig products has been fairly steady, as will be seen from the official figures following, and which show the imports of bacon, hams, and lard for the last three years.

		Cwt.	£
Bacon:	1906	5,413,056	14,306,290
	1907	5,250,955	14,533 985
	1908	5,604,772	14,249,263
Hams:	1906	1,269,942	3,364,596
	1907	1,097,397	3,098,028
	1908	1,184,337	2,937,983

	Cwt.	£
Lard (excluding imitation lard):		
1906 ..	1,857,088	3,959,656
1907 ..	1,800,151	4,112,058
1908 ..	1,876,656	4,151,138

These figures indicate fairly steady markets, which during the present year will be entirely altered. The shrinkage in this department of our food supply cannot be less than 20 per cent. The supply of pig products from the United States was at its highest between 1898 and 1901, and since then it has suffered a continuous decline, which has, however, been counterbalanced by supplies from Canada, Denmark and other countries. The average quantity has been about the same.

Naturally, under such circumstances, we turn to our home conditions in order to see if anything is being done to avert the coming famine, and, at the very outset, are met with the figures from the preliminary statement just issued by the Board of Agriculture, in which the numbers of live stock in the United Kingdom are given. We find that there is a lamentable shortage of pigs as compared with last year. The figures are as follows:—

Agricultural Returns up to 4th June in each Year.

	1909	1908
Sows kept for breeding purposes	316,552	369,476
Other pigs	2,064,335	2,454,006
Totals	2,380,887	2,823,482

These show a decrease of 52,924 or 14·32 of breeding sows as compared the one year with the other, and a total decrease in the pig supply of Great Britain of 442,595 or 15·7 per cent. In so far as Ireland is concerned a very considerable shortage is also to be recorded here, and unfortunately one of the items is a smaller number of breeding sows by about 20,000.

It will thus be seen that we have reached a perilous condition in so far as swine husbandry and bacon curing is concerned. The demand for pig products goes on increasing from year to year, and it seems difficult to understand why farmers do not endeavour to cultivate pigs to a greater extent. Year in and out they yield a larger profit than any other live stock, inasmuch as they can be fed on food which would otherwise be wasted. It is true that at the moment feeding meal is dear, but even at the present price of about 9s. per cwt. there is a handsome profit in pig feeding. In ordinary times there is a good profit with pigs fetching 42s. per cwt. dead weight. Such a figure pays the farmer and pays the bacon curer. At the moment, however, the dead weight of pigs is about sixpence per lb., and in some markets rather more.

Now, surely, is the opportunity for the British farmer. Many countries are looking to the United Kingdom as an outlet for the product from new bacon and pig product establishments now being constructed. Some of these are as far away as China! Only recently a cargo of frozen Chinese pork was brought to London and has been absorbed without any trouble. Now it is proposed to cure the pig on the spot in that country and ship the product to the United Kingdom in the finished state. In Russia, again, new bacon factories are being constructed, as also in France and in some other European States: all with a view to supply the British market. Why should not the farmers of the United Kingdom try to do some of this supplying themselves?

We send away upwards of £20,000,000 per annum to foreign countries for pig products, and much of it could, with a little organisation, be retained at home. It will be remembered that, about 1887, the farmers of Denmark were without warning prohibited from sending their live swine into Germany, and they at once formed themselves into co-operative societies with the object of fostering swine husbandry and erecting bacon factories. They knew that the British farmers were not taking advantage of their opportunities, and that there was plenty of demand for bacon in England. The latest available Consular report tells the remainder of the story. It says:—

The first co-operative slaughter-house was founded in 1887 in Jutland (Denmark); in 1897 there were 21 co-operative slaughter-houses with a membership of 42,000; in 1900, 26 slaughter-houses and 60,000 membrs; in 1905, 32 slaughter-houses and 70,000 members; and in 1908, 33 slaughter-houses and 101,456 members.

During 1908 the Danish co-operative slaughter-houses accounted for 1,549,550 pigs, against 1,311,241 pigs in 1907, besides 16,004 cattle and 14,344 calves.

Other slaughter-houses in Denmark slaughtered about 500,000 pigs, thus bringing the total number slaughtered in the country up to over 2,000,000.

So much for organisation and taking advantage of opportunity. Most of the bacon referred to in these figures was sold and eaten in the United Kingdom.

This is therefore primarily a question for farmers and farmers' societies. There are many areas in the United Kingdom where bacon factories would undoubtedly flourish because of their proximity to pig growing districts and also because of the facilities for conveying produce to large towns. In cheese making and dairying districts this is especially so as the bye-products of the dairy, in the shape of whey or separated milk, are amongst the best feeding stuffs in a pig feeding ration.

Natal's Progress in 1908.

By H. J. CHOLES, F.S.S.

(*Continued from Page 464.*)

VI.—OUR TRADE IN FARM PRODUCTS.

We may now proceed to examine the production, imports, exports, and consumption of various products in which the Natal farmer is directly or indirectly interested. Most of the figures given in the statements that follow, in this section, are taken from the Annual Bluebook of the S.A. Customs Statistical Bureau.

(1) OUR FRESH MEAT SUPPLY.

The following statement reflects the trade in imported and South African beef, mutton and pork. It is interesting to notice that the imports from oversea are still on the decrease, having fallen from 40 million pounds in 1907 to 17 millions in 1908—a very gratifying decrease. Much of this meat, of course, goes to the Transvaal and elsewhere, but a quantity is also consumed in this Colony, and in the figures relative to the consumption of imported meat we find a drop from three to one and a half millions, which, indeed, is something worth pondering over. Our exports of Natal beef to the Transvaal show an increase of some six million pounds, due of course, chiefly to East Coast Fever.

	1907 lbs.	1908 lbs.
Imports—		
Oversea—		
Beef and Veal	27,943,746	10,242,861
Mutton and Lamb	11,690,228	6,809,579
Pork	423,514	7,869
Total Oversea	40,057,488	17,060,309
South Africa—		
Beef and Veal	6,653	13,657
Mutton and Lamb	9,596	1,424
Pork	517	1,245
Total South Africa	16,766	16,326
Total Imports	40,074,254	17,076,635

	1907 lbs.	1908 lbs.
Exports (Not S.A.P.)—		
By Sea—		
Beef and Veal	370,361	272,875
Mutton and Lamb	164,432	156,628
Pork	6,294	1,499
Cape Colony—		
Beef and Veal	45,180	342,555
Mutton and Lamb	22,144	25,574
Pork	3,416	—
Orange River Colony—		
Beef and Veal	666,689	177,049
Mutton and Lamb	268,573	80,098
Pork	2,255	47
Transvaal—		
Beef and Veal	23,656,124	10,382,818
Mutton and Lamb	9,533,094	4,641,066
Pork	402,941	31,099
	35,141,503	16,111,308
Exports (S.A.P.) —		
By Sea—		
Beef and Veal	—	32,823
Mutton and Lamb	—	9,016
Pork	1,659	2,336
Cape Colony—		
Beef and Veal	47,578	43,229
Pork	31,740	2,616
Orange River Colony—		
Beef and Veal	308,736	24,111
Pork	1,202	3,852
Transvaal—		
Beef and Veal	11,181,008	17,115,495
Mutton and Lamb	23,026	9,956
Pork	81,020	55,022
	11,675,969	17,298,456
Net Consumption in Natal of Imports		
Beef and Veal	*619,902*	*58,090*
Mutton and Lamb	*2,434,949*	*1,465,346*
Pork	*13,126*	—
	3,067,977	*1,523,436*

Our farmers turned out, in 1908, 135,485 lbs. of pork (152,628 lbs. in 1907), and 130,636 lbs. of meat other than pork (124,105 lbs. in 1907).

STOCK IN POSSESSION OF EUROPEANS.

The following is a statement of the numbers of cattle, sheep, and pigs in possession of Europeans on the 1st August, 1906, 1907 and 1908, respectively:—

	1906	1907	1908
Cattle :—			
Bulls, imported	127	159	144
Bulls, Colonial	3,922	3,900	3,772
Cows	84,093	78,537	75,790
Oxen	66,630	62,816	59,275
Other Cattle	89,085	82,336	81,432
	243,857	227,748	220,413
Sheep :—			
Rams, imported	327	368	417
Rams, Colonial	7,990	10,084	11,331
Sheep, woolled	524,712	574,068	665,222
Kafir Sheep	50,126	58,039	63,423
Persian Sheep	16,900	18,907	24,984
	600,055	661,466	765,377
Pigs :—			
Boars, imported	50	52	66
Boars, Colonial	1,356	1,440	1,410
Sows	5,729	6,293	6,804
Other Pigs	16,242	17,137	17,397
	23,377	24,922	25,677

(2) DAIRY PIG AND POULTRY FARMING.

A notable feature in our trade in dairy products last year, was the increase in our exports of South African butter and cheese to the Transvaal. The exports of butter jumped from 94,000 lbs. in 1907 to 290,000 lbs. in 1908; and at the same time the imports by the Transvaal of foreign butter through Natal decreased from 3,223,00 lbs. to 2,799,000 lbs., approximately. As regards cheese, the exports of South African produce from Natal to the Transvaal, it will be seen, have increased from 5,700 lbs. to 13,600 lbs. To Cape Colony, too, our exports of cheese have increased—in this case fivefold.

This is a very gratifying state of affairs, but it is not so pleasant to contemplate the increased consumption in Natal of imported cheese—463,861 æs. last year, as compared with 386,357 lbs. in 1907. The consumption of imported butter, however, was less last year than in the previous year.

The following figures reflect the trade in these two products and condensed milk during the last two years:—

Butter.

	1907 lbs.	1908 lbs.
Produced in Natal	819,842	820,000
Imports	4,469,653	4,131,788
Exports (Not S.A.P.)—		
By Sea	26,135	32,346
Cape Colony	83,834	28,453
Orange River Colony ...	112,364	118,159
Transvaal	3,223,097	2,799,521
Southern Rhodesia	—	206
Basutoland	152	—
Swaziland	—	212
	3,445,582	2,978,897
Exports (S.A.P.)—		
By Sea	308	—
Cape Colony	125	542
Orange River Colony ...	716	3,383
Transvaal	94,472	290,060
Southern Rhodesia	50	1,300
Basutoland	116	25
	95,787	295,310
Net Consumption in Natal of Imports	*1,073,486*	*845,023*

Cheese.

	1907 lbs.	1908 lbs.
Produced in Natal	39,868	40,000
Imports—		
By Sea	1,557,141	1,593,317
South Africa	82,322	112,101
	1,639,463	1,705,418
Exports (Not S.A.P.)—		
By Sea	10,195	5,853
Cape Colony	12,431	5,787
Orange River Colony ...	97,676	81,688
Transvaal	1,068,615	1,044,914
Southern Rhodesia	154	1,705
Basutoland	129	483
Swaziland	—	692
	1,189,200	1,141,122

	1907 lbs.	1908 lbs.
Exports (S.A.P.)—		
By Sea	241	454
Cape Colony	3,722	19,179
Orange River Colony ...	1,481	2,044
Transvaal	5,728	13,639
Southern Rhodesia		966
Swaziland	—	39
	11,172	36,321
Net Consumption in Natal of Imports	*386,357*	*463,861*

Condensed Milk.

	1907 lbs.	1908 lbs.
Imports	4,890,715	4,378,611
Exports (Not S.A.P.)—		
By Sea	15,927	—
Cape Colony	31,551	28,294
Orange River Colony ...	201,704	121,973
Transvaal	1,794,280	1,166,191
Southern Rhodesia	4,935	3,709
Basutoland and Bechuanaland ...	1,524	1,473
Swaziland	—	2,059
	2,049,921	1,323,699
Net Consumption of Imports in Natal	*1,914,848*	*2,851,985*

There is nothing particular to note with regard to the trade in bacon and hams and lard, except that, whilst we are exporting less in the way of bacon and hams, we are producing more for our own consumption and consuming less of the imported article, which is satisfactory enough. The same, however, cannot be said with regard to lard, for although we appear to be producing more locally, we are at the same time consuming more imported lard. The situation with regard to these products will be understood from a study of these figures:—

Bacon and Hams.

	1907 No.	1908 No.
Pigs owned by Europeans in Natal ...	24,922	25,677
	lbs.	lbs.
Bacon and Hams produced in Natal	883,866	900,000
Imports	2,466,989	2,325,833

Bacon and Hams.—(Continued).

	1907 lbs.	1908 lbs.
Exports (Not S.A.P.)—		
By Sea	3,940	2,782
Cape Colony	10,510	18,335
Orange River Colony ...	74,468	59,461
Transvaal	1,690,208	1,529,592
Southern Rhodesia	896	44
Basutoland	264	844
Swaziland	—	1,402
	1,780,286	1,612,460
Exports (S.A.P.)—		
By Sea	—	10
Cape Colony	1,552	20
Orange River Colony ...	9,897	8,784
Transvaal	20,944	5,386
Basutoland	189	407
	32,582	14,607
Net Consumption of Imports in Natal	*721,370*	*682,451*

Lard.

	1907 lbs.	1908 lbs.
Produced in Natal	47,616	56,289
Imports	759,768	501,443
Exports (Not S.A.P.)—		
By Sea	2,368	2,904
Cape Colony	21,167	3,816
Orange River Colony ...	16,596	10,322
Transvaal	498,358	297,868
Southern Rhodesia	900	606
Basutoland	—	2
Swaziland	—	4,782
	539,389	320,300
Exports (S.A.P.)—		
Cape Colony	380	100
Orange River Colony ...	—	50
Transvaal	100	158
	480	308
Net Consumption of Imports in Natal	*174,278*	*199,716*

An idea as to the trade in eggs and poultry is afforded by the following statements:—

Eggs.

	1907 No.	1908 No.
Sold by Europeans in Natal ...	6,317,160	5,664,120
Imports	1,848,396	1,503,628
Exports (Not S.A.P.) –		
Orange River Colony ...	19,524	10,560
Transvaal	749 322	810,594
Southern Rhodesia	2,520	—
	771,366	821,154
Exports (S.A.P.)—		
Cape Colony	144	1,644
Orange River Colony ...	7,512	12,816
Transvaal	493,620	661,584
Southern Rhodesia	—	360
	501,276	676,404
Net Consumption of Imports in Natal	*1,043,834*	*603,632*

Poultry.

	1907 No.	1908 No.
Fowls, Ducks and Geese owned by Europeans in Natal	278.850	354,405
	lbs	lbs.
Imports of Frozen Poultry ...	869,456	332 716
Net Consumption in Natal of Imports	*62,140*	*10,026*

(3) WOOL AND HAIR.

Our production and exports of wool and mohair are still on the increase, as is shown in the following statements. The total exports of mohair were less last year than in 1907, but the exports by sea (which are more important) were greater. For both products the figures show a satisfactory state of affairs.

Wool.

	1907 lbs.	1908 lbs.
Produced in Natal	1,979.999	2,160,905

Wool.—(Continued).

	1907 lbs.	1908 lbs.
Imports—		
Cape Colony	1,728,110	1,329,013
Orange River Colony ...	8,160,679	9,761,093
Transvaal	6,693,255	7,827,181
Basutoland	571,809	482,147
Bechuanaland	—	360
	17,153,853	19,399,794
Exports (S.A.P.)—		
By Sea	20,264,098	24,117,180
Orange River Colony ...	5,066	300
Transvaal	2,778	4,914
	20 271,942	24,122,394

Mohair.

	1907 No.	1908 No.
Angora Goats in possession of Europeans	87,436	18,349
	lbs.	lbs.
Mohair produced in Natal ...	207,628	219,825
Imports—		
Cape Colony	14,146	11,497
Orange River Colony ...	672,427	472,545
Transvaal	234,162	174,767
Basutoland	141,984	23,968
	1,062,719	682,777
Exports (S.A.P.)—		
By Sea	1,125,957	1,319,636
Cape Colony	8,021	—
	1,133,978	1,319,636

(4) THE FRUIT INDUSTRY.

An examination of the figures regarding the production, exports and imports of fresh fruit, shows unmistakable indications of progress. There is a noteworthy increase, for example, in the quantities of fresh fruit sold by European growers—from £37,957 in value in 1907 to £52,627 last year. Still greater, proportionately, is the decrease in the consumption of imported fruit: in 1907, we consumed £24,425 worth of fruit grown outside the borders of Natal, while last year we spent £9,456 only. This improved state of things serves as a counterbalance

to the shrinkage in exports of Natal fruit which the Customs figures indicate. The general position is reflected in the following statement:—

Fruit.

	1907 £	1908 £
Fruit sold in Natal by Europeans ...	37,957	52,627
Fruit sold in Natal by Indians ...	17,000	18,000*
Fruit canned and preserved ...	2,642	2 099
	57,599	72,726

* Estimated.

Imports—		
By Sea	30,398	12,971
South Africa	6,692	4,311
	37,090	17,282
Exports (Not S.A.P.)—		
By Sea	388	143
Cape Colony	342	247
Orange River Colony ...	758	477
Transvaal	4.779	2,757
Southern Rhodesia	—	3
Basutoland	9	2
	6,276	3,629
Exports (S.A.P.)—		
By Sea	2,739	2,112
Cape Colony	28,393	29,475
Orange River Colony ...	11,290	10,644
Transvaal	73,526	55,722
Southern Rhodesia	290	752
Basutoland	66	82
Bechuanaland	—	1
	116,304	98,788
Net Consumption in Natal of Imports	*24,425*	*9,456*

The figures at my disposal do not enable me to form an estimate of the value of jams and jellies produced in Natal in 1908 sufficiently approximate to permit of a just comparison with the 1907 production. Roughly, the production is probably in the vicinity of £9,000 in value. An idea of the trade in jams and jellies, both of South African and of foreign manufacture, will be obtained by a study of the following figures:—

Jams and Jellies.

	1907 lbs.	1908 lbs.
Imports—		
By Sea	890 093	683.268
South Africa	110 287	137,136
	1,000.380	820,404
Exports (Not S.A.P.)—		
By Sea	10.483	5 965
Cape Colony	15,409	10,274
Orange River Colony ...	52,404	36 416
Transvaal	715 842	466 098
Southern Rhodesia	2 646	5 743
Basutoland	144	444
Swaziland	—	912
	796,928	525,852
Exports (S.A.P.)—		
By Sea	21,530	12,184
Cape Colony	149,785	88,348
Orange River Colony ...	46,431	53,474
Transvaal	335.758	310,205
Southern Rhodesia	369	9,039
Basutoland	144	1,152
Swaziland	—	654
	555,017	475,056
Net Consumption of Imports in Natal	*256,887**	*298,664**

* These figures include consumption of Marmalade.

(5) GRAIN AND PULSE.

The following statements reflect the trade, in 1908 as compared with 1907, in barley (grain), oats (grain), maize and maize products, Kafir corn, rice, wheat, and beans and peas:—

Barley (Grain).

	1907 lbs.	1908 lbs.
Produced in Natal	345,800	446,200
Imports—		
By Sea	3,178	5,561
South Africa	301,598	174,621
	304,776	180,182

Barley (Grain).—(Continued).

	1907	1908
Exports (Not S.A.P.)—	lbs.	lbs.
By Sea	122	—
Cape Colony	2,830	50
Orange River Colony ...	1,766	300
Transvaal	3,881	3,742
	8,529	4,092
Exports (S.A.P.)—		
By Sea	5,250	14,384
Cape Colony	18,807	785
Orange River Colony ...	1,491	1,101
Transvaal	3,291	4,545
Southern Rhodesia	400	300
	29,239	21,115
Net Consumption in Natal of Imports	—	3,725

Oats (Grain).

	1907	1908
	lbs.	lbs.
Produced in Natal	286,200	357,480
Imports—		
By Sea	912,416	451,154
South Africa	761,806	2,799,470
	1,674,222	3,250,624
Exports (Not S.A.P.)—		
By Sea	7,826	1,351
Cape Colony	89,969	62,304
Orange River Colony ...	17,371	1,142
Transvaal	388,148	114,083
Southern Rhodesia	22,914	487
	526,228	179,367
Exports (S.A.P.)—		
By Sea	408	1,356,287
Cape Colony	8,388	17,062
Orange River Colony ...	5,294	13,753
Transvaal	76,228	103,957
Southern Rhodesia	5,456	8,250
	95,771	1,402,409
Net Consumption of Imports in Natal	827,022	231,649

Maize, Maize Meal, and Samp.

	1907 lbs.	1908 lbs.
Maize produced in Natal by Europeans	111,086,400	132,854,000
Imports—		
By Sea	213,347	235,826
South Africa	41 610,470	45,183,103
	41,823,817	45,195,073
Exports (Not S.A.P.)—		
Orange River Colony	540	—
Transvaal ...	7,014	2,036
Swaziland	—	3
	7,554	2,039
Exports (S.A.P.)—		
By Sea	86,019,974	73,368,537
Cape Colony	21.950,853	45,651,338
Orange River Colony ...	650.659	265,145
Transvaal	11,370.636	3,324.597
Southern Rhodesia	1,615	40,390
Bechuanaland	13.690	1,000
	120,007,427	122,651,007

Kafir Corn.

	1907 lbs.	1908 lbs.
Produced in Natal by Europeans ...	5,684,800	5,356,400
Imports—		
By Sea	—	301,772
Cape Colony	305,596	3,127,575
	305,596	3,429,347
Exports (S.A.P.)—		
By Sea	7,500	58,020
Cape Colony	175,236	300,420
Orange River Colony ...	59 694	5,593
Transvaal	2,209.444	181.471
Southern Rhodesia	200	—
	2,452,074	545,414

Rice.

	1907 lbs.	1908 lbs.
Imports	42,115,096	38,470,781
Exports—		
By Sea	499,403	270,706
Cape Colony	397,012	172,095
Orange River Colony ...	475,306	570,967
Transvaal	8,991,779	4,642,280
Southern Rhodesia ...	10,752	16,572
Basutoland	6,957	13,448
Bechuanaland	—	164
Swaziland	—	7,673
	10,381,209	5,693,905

Wheat and Flour.

	1907 lbs.	1908 lbs.
Wheat produced in Natal ...	211,600	218,600
Exports (S.A.P.)—		
Wheat—		
Oversea	—	40
Cape Colony	560	51,618
Orange River Colony ...	1,949	18,061
Transvaal	16,251	4,328
	18,760	74,047
Flour—		
By Sea		53,975
Cape Colony ...	500	10,866
Orange River Colony ...	4,670	248,752
Transvaal	20,318	170,844
Basutoland	—	100
Southern Rhodesia ...	—	2,640
	25,488	487,077

Beans and Peas.

	1907 lbs.	1908 lbs.
Produced in Natal	1,087,600	1,481,000
Imports—		
By Sea	502,313	585,779
South Africa	13,675	41,256
	515,988	627,035

Beans and Peas.—(Continued).

	1907 lbs.	1908 lbs.
Exports (Not S.A.P.)—		
By Sea	4,586	77,044
Cape Colony	12,971	1,879
Orange River Colony ...	14,314	23,093
Transvaal	263,251	337,301
Southern Rhodesia	—	100
Basutoland	—	17
	295,122	439,434
Exports (S.A.P.)—		
By Sea	383	65,985
Cape Colony	29,950	261,413
Orange River Colony ...	345	4,099
Transvaal	242,719	122,246
Southern Rhodesia	800	830
Swaziland	—	200
	274,197	454,773
Net Consumption of Imports in Natal	*216,916*	*197,551*

(6) FODDER AND FORAGE.

The provision of special fodder for stock, whether for winter or otherwise, is always a sign of progress in economic farming, and in Natal it is a matter of very considerable importance, especially since East Coast Fever has been ravaging our herds. Taking the forage crops, barley, millet, oats, sugar cane, and lucerne, etc., as well as exotic grasses, we find the following gratifying increases in the areas under these crops:—

	1907 acres.	1908 acres.	Increase. acres.	Increase. per cent.
Barley	2,258	2,568	310	13·8
Millet	2,178	2,481	303	14·0
Oats	5,768	6,768	1,040	18·2
Sugar Cane (for fodder)	1,276	1,459	183	14·4
Lucerne	637	1,041	404	63 5
Other Green Crops ..	1,382	1,624	242	17·6
	13,459	15,941	2,482	18·4

We thus have an increase of 2,482 acres, equivalent to a little over 18 per cent., in the area under green fodder crops—an increase that is by no means to be despised. Studying the crops individually, we find a very large increase—63½ per cent.—in the area under lucerne, whilst there is a noteworthy increase of 18 per cent. in the area under oats.

The percentage of the increases, which I have shown at the right of the statement above, affords a very good indication of the direction in which farmers are inclined to turn their energies; and we find that,

whilst oats are grown to the largest extent, and barley and millet also over considerable areas nevertheless greatest interest is being displayed in lucerne. Oats, however, come next, and bid fair to hold their own among the cereals grown for fodder.

The production of these fodder crops has, in the aggregate, jumped from 19,730 tons in 1907 to 23,635 tons in 1908, an increase of nearly 20 per cent.—19·7 per cent., to be more exact—which corresponds very well with the increase in the total area recorded above.

In the figures afforded by the Customs Bluebooks on the subject of consumption of imported foodstuffs we have further matter for congratulation, for we find that last year we used 478,206 lbs. only of imported fodder and forage as compared with 3,016,746 lbs. the year before—a drop of 84 per cent.!

The following figures will be found of interest:—

Fodder and Forage.

	1907 lbs.	1908 lbs.
Produced in Natal	44,195,200	52,942,400
Imports—		
By Sea	12,764,800	2,973 635
South Africa	4,206,212	4,944,226
	16,971.012	7,917,861
Exports (Not S.A.P.)—		
By Sea	139,052	5,525
Cape Colony	47,736	5 745
Orange River Colony ...	178,545	2,876
Transvaal	143,288	37,052
Southern Rhodesia	37,522	11,219
	546,143	62,417
Exports (S.A.P.)—		
By Sea	1,817.239	5,323,642
Cape Colony	476,945	197,438
Orange River Colony ...	339,418	509,451
Transvaal	2,766,969	2,043,623
Southern Rhodesia	28,960	36,002
Basutoland	4,000	—
Swaziland	—	520
	5,433,531	8 110,676
Net Consumption of Imports in Natal	*3,016,746*	*478,206*

(7) VEGETABLES.

The following statements show the direction and volume of trade in potatoes, onions, and other vegetables. As will be seen, our exports of potatoes have evidently increased in greater proportion than our production, and as a result we have had to import more for local consumption. Onions show not only an increased consumption of imports, but also a smaller production and smaller exports of South African produce:—

Potatoes

	1907 lbs	1908 lbs.
Produced in Natal	21,514,950	22,865,250
Imports—		
By Sea	1,873,468	2,748,550
South Africa	496,362	533,495
	2,369,830	3,282,045
Exports (Not S.A.P.)—		
By Sea	14,445	158,121
Cape Colony	22,922	29,871
Orange River Colony ...	306,994	206,103
Transvaal	804,359	512,854
Southern Rhodesia	—	1,840
Bechuanaland	—	400
Swaziland	—	182
	1,148,720	909 371
Exports (S.A.P.)—		
By Sea	22 774	84.800
Cape Colony	230.803	1,164.721
Orange River Colony ...	159,586	332,612
Transvaal	7,989,722	10,694,920
Southern Rhodesian	—	15,100
Basutoland	430	580
	8,403,335	12,292,733
Net Consumption of Imports in Natal	*553,997*	*1,922,244*

Onions.

	1907 lbs.	1908 lbs.
Produced in Natal	961,350	783,750
Imports—		
By Sea	732,499	806,383
South Africa	998,203	714,944
	1,730,702	1,521,327

Onions.—(Continued).

	1907	1908
Exports (Not S.A.P.)—	lbs.	lbs.
By Sea	4,934	17,382
Cape Colony	11,657	9,578
Orange River Colony ...	25,238	18,862
Transvaal	60,878	68,679
Southern Rhodesia	—	10
Basutoland	258	675
Swaziland	—	25
	102 965	115,211
Exports (S.A.P.)—		
By Sea	150	1,650
Cape Colony	6,070	7,071
Orange River Colony ...	33,709	23,954
Transvaal	54,631	51,235
Southern Rhodesia	1,183	548
Basutoland	250	60
Swaziland	—	282
	95,933	84,800
Net Consumption of Imports in Natal	*654,863*	*712,917*

Vegetables (Fresh).

	1907	1908
Produced in Natal—	£	£
By Europeans	2,706	3,019
By Indians	4,421	5,000
	7,127	8,019
Exports (S.A.P.)—		
By Sea	38	11
Cape Colony	860	815
Orange River Colony ...	2,877	2,598
Transvaal ...	8,799	4,712
Basutoland	18	13
	12,592	8,149

* Estimated.

(8) SPECIAL CROPS.

Under this heading I propose to deal with sugar, tea, tobacco, and wattle bark, four industries which though connected with the land, involve more or less of a technical knowledge and thus come rather outside the ordinary farmer's sphere.

Some interesting changes in our trade in these products are revealed by the figures in the statements that follow. We find, for instance, gratifying increases in the production of three of these crops—to the extent of 32 per cent. in the case of sugar, ten per cent. in the

case of tea, and nearly 21 per cent. in the case of wattle bark. Tobacco certainly only shows an increase of one per cent., but no large increase was to be looked for in view of the desultory way in which the industry is being carried on at the present time. Again, we find that the consumption of imported sugar has fallen by three million pounds—a drop equivalent to 32 per cent. This fall, however, refers only to sugar: of imported molasses and treacle, and golden syrup, we consumed a little more last year than in 1907. Not only did we consume 32 per cent. less of imported sugar, but we also exported 50 per cent. more of our sugar and sugar products. The figures regarding exports are especially worthy of study, as they show some large increases. Tea shows a slight increase in the consumption of the imported product, and the exports of Natal tea were less last year than in the year previous.

The following statements show the direction of trade in these products during the two years under review:—

Sugar and Sugar Products.

	1907	1908
	lbs.	lbs.
Produced in Natal—		
Sugar	54,260,000	71,664,000
Molasses	3,245,820	3,835,000
	57,505,820	75,499,000
Imports—		
Sugar	12,777,655	7,569,534
Molasses and Treacle ...	9,238	14,162
Golden Syrup	1,252,598	1,210,286
	14,039,491	8,793,982
Exports (Not S.A.P.)—		
By Sea—		
Sugar	87,304	54 265
Sugar Products	28	510
Cape Colony—		
Sugar	468,210	194,492
Sugar Products	15,855	5,951
Orange River Colony—		
Sugar	1,187,788	301,144
Sugar Products	80,251	82,499
Transvaal—		
Sugar	2,312,567	696,066
Sugar Products	955,813	929,271
Southern Rhodesia—		
Sugar	24,753	162,871
Sugar Products	—	16
Basutoland—		
Sugar	11,821	1,210
Sugar Products	560	142
Swaziland—		
Sugar	—	382
Sugar Products	—	136
	5,144,950	2,428,955

Sugar and Sugar Products.—(Continued).

	1907 lbs.	1908 lbs.
Exports (S.A.P.)—		
By Sea—		
Sugar	31,239	588,251
Molasses, etc.	21,133	2,160,726
Golden Syrup	—	19,544
Cape Colony—		
Sugar	12,831,058	17,978,215
Molasses, etc.	126 708	120,442
Golden Syrup	247,037	414,125
Orange River Colony—		
Sugar	7,231,572	11,897,016
Molasses, etc.	72,424	23,351
Golden Syrup	65,738	77,058
Transvaal —		
Sugar	31,480,085	45,614,567
Molasses, etc.	186,064	175,107
Golden Syrup	259,361	209,630
Southern Rhodesia—		
Sugar	275,535	655,661
Molasses, etc.	2,572	2,112
Golden Syrup	5,348	16,068
Basutoland—		
Sugar	378,655	403,674
Molasses, etc.	—	2,100
Golden Syrup	4,084	884
Bechuanaland—		
Sugar	255,649	291,134
Golden Syrup	2,968	2,900
Swaziland—		
Sugar	—	79,492
Golden Syrup	—	12
	53,477,230	80,732,069
Net Consumption in Natal of Imports		
Sugar	*9,044,751*	*6,029,013*
Molasses and Treacle ...	*3,886*	*7,112*
Golden Syrup	*223,831*	*233,071*
	9,272,508	*6,269 196*

Tea.

	1907 lbs.	1908 lbs.
Produced in Natal	2,965,838	3,278,464
Imports—		
By Sea	1,350,658	1,589,690
South Africa	3,227	11,178
	1,353,885	1,600,868

Tea.—(Continued).

	1907 lbs.	1908 lbs.
Exports (Not S.A.P.)—		
By Sea	13,236	24,725
Cape Colony	83,586	35,420
Orange River Colony ...	91,379	92,744
Transvaal	967,394	1,123,226
Southern Rhodesia	3,376	5,352
Basutoland	375	694
Bechuanaland	—	100
Swaziland	—	692
	1,159,346	1,282,953
Exports (S.A.P)—		
By Sea	584,299	276,558
Cape Colony	331,916	355,683
Orange River Colony .	47,980	67,271
Transvaal	262,064	349,654
Southern Rhodesia	2,336	9,133
Basutoland	1,264	2,505
Bechuanaland	2,129	3,634
Swaziland	—	1,054
	1,231,988	1,065,492
Net Consumption of Imports in Natal	*224,518*	*274,319*

Tobacco.

	1907 lbs.	1908 lbs.
Produced by Europeans	301,599	304,916
Exports S.A.P.)—		
By Sea—		
Unmanufactured	401	5,803
Cigars	445	601
Cigarettes	2,312	173
Manufactured, N.O.D. ...	3,034	3,225
	6,192	9,802
Cape Colony—		
Unmanufactured	246,772	168,495
Cigars	21,772	42,792
Cigarettes	4,228	7,192
Manufactured, N.O.D. ...	25,442	13,684
	298,214	232,163

Tobacco.—(Continued).

	1907 lbs.	1908 lbs.
Orange River Colony—		
Unmanufactured	43,033	33,442
Cigars	3,513	4,177
Cigarettes	20,679	17,355
Manufactured, N.O.D. ...	17,513	20,688
	84,738	75,662
Transvaal —		
Unmanufactured	906,486	1,123,626
Cigars	35,718	34,879
Cigarettes	13,211	7,284
Manufactured, N.O.D. ...	51,851	30,624
	1,007,266	1,196,413
Southern Rhodesia—		
Unmanufactured	3,800	500
Cigars	315	555
Cigarettes	—	7
Manufactured, N.O.D. ...	73	300
	4,188	1,362
Basutoland—		
Unmanufactured	513	136
Cigars	42	63
Cigarettes	98	220
Manufactured, N.O.D. ...	—	56
	653	475
Swaziland—		
Unmanufactured	—	4,390
Cigars	—	6
Cigarettes	—	63
Manufactured, N.O.D. ...	—	52
	—	4,511
Grand Total of Exports (S.A.P.) ...	1,401,251	1,520,381

Wattle Bark.

	1907 lbs.	1908 lbs.
Produced in Natal	26,535,040	32,057,920
Imports—		
By Sea	1,564	—*
Cape Colony (E.G.)	99,163	143,579
	100,727	143,579
Exports		
By Sea	53,400,026	55,075,787
Cape Colony ...	823,312	1,496,301
Orange River Colony ...	—	2,642
	54,223,338	56,574,730†

* £60 worth of bark was imported from Madagascar, and £1 worth from Portuguese East Africa : quantities not given.

† £89 worth also was exported to the Transvaal : quantity not specified.

(9) OTHER INDUSTRIES.

The trade in the products of other industries in 1908 as compared with 1907 is reflected in the following statement:—

	1907 £	1908 £
Exports (S.A.P.)—		
Ale, Beer, Stout and Cider—		
By Sea	325	556*
South Africa	33,727	27,583*
	34,052	28,139
Biscuits, Bread and Cakes—		
By Sea	72	234
South Africa	13,093	16,381
	13,165	16,615
Carriages, Carts, etc.—		
By Sea	4,618	2,825
South Africa	29,446	39,576
	34,064	42,401
Confectionary (exclusive of Jams, Jellies and Honey)—		
By Sea	44	22
South Africa	11,841	11,787
	11,885	11,809

* No South African Cider exported.

Other Industries.—(Continued).

	1907 £	1908 £
Matches—		
By Sea	611	795
South Africa	73,275	78,401
	73,886	79,196
Pickles and Sauces—		
By Sea	34	34
South Africa	1,231	1,225
	1,265	1,259
Saddlery and Harness—		
By Sea	168	25
South Africa	953	1,447
	1,121	1,472
Soap, Common—		
By Sea	1,597	3,508
South Africa	48,828	56,293
	50,425	59,803

There are over twelve thousand traction engines built annually in the United States, aggregating about £5,000,000.

Don't put off till to-morrow that which should be done to-day. A few days' growth of the weeds will make an extra day's labour for your force.

The first hen out in the morning and the last one in at night are almost certain to be two of the best ones you have, although the one that gets into the garden every day will give either of them a close chase for first place.

Natal Bee-Keepers' Association.

MONTHLY NOTES AND COMMENTS.

By W. C. MITCHELL, Hon. Secretary, Cedara.

THE annual subscription to the Association is 2s. 6d. per annum, and the secre ary will be pleased to hear from all bee-keepers who are not already members.

* * *

It is hoped that members will make some effort to supply these columns with a little interesting matter occasionally on any subject relating to bees. The district reports might cover a much larger area than they do at present.

DISTRICT REPORTS.

Camperdown.—Mr. Gavin reports colonies extra strong, two swarms during October, light yellow pollen being gathered from buckwheat and dark nectar from the same source. Members will be sorry to hear also that Mr. Gavin's bees developed a regular buckwheat temper and attacked the poultry yard, killing 20 fowls.

Deepdale.—Mr. Harrington reports colonies doing fairly well, nectar being gathered from bottle-brush, fruit bloom, etc., pollen from wild daisies. No swarms so far.

Cedara.—Colonies strong and some surplus already taken. One colony that came through the winter as a two-frame nucleus, being a small swarm taken from the coast, has already provided material for a four-frame nucleus, leaving a strong colony behind.

New Hanover.—Mr. Hibbert reports no surplus being gathered owing to prevailing strong winds, but colonies strong and hives full of bees. Pollen, yellow to greenish yellow, being gathered from chickweed and syringa, nectar coming from wattle, syringa and fruit bloom.

SCIENTIFIC BEE-KEEPING.

October is the beginning of a new year for the bees: for the bee-keeper it is the beginning of a new time, when he watches them not from a commercial only but from a scientific, that is, an evolutionary standpoint. He then sees them not as things isolated and apart but in their place in the scheme of things—a link in life's wonderful chain—a verse in the story—or is it a song—of the House the Sun Built.

To follow this chain back and back from the link marked bees, from these winged manifestations of life that live in the sunshine, to its very beginnings is a fascinating task; from the air to the earth, from the earth to the shore, from the shore to the depths of the sea, to the very cradle of life itself. A wonderful world this world at the bottom of the sea—known only to scientists since the days of the "Challenger" expeditions, when at depths equal to reversed Himalayas they found a world of utter calm, for storms are only on the surface, a world of utter darkness, for the light from the lumps of phosphoresence does not pierce—a world of utter cold.

The picture makes one shiver, but here in these awful depths are the earliest forms of life—the beginnings of struggle and of love. We hasten gladly from the darkness of this region to the gloom of lesser depths, from the gloom to the twilight, from the twilight to the sunlight—in short to a picture in vivid contrast—the picture of our bees playing in the sunlight.

And when next someone asks, "Why do you keep bees?" we can honestly say, "To deepen our wonder in the world, our love of beauty—and our joy in living."—H.R.

BEE FEVER.

By HENRY MARTIN, Dannhauser.

Do not think, dear reader, when you see the above title that I am going to inflict upon your attention a discussion on a disease affecting the inmates of the hive. So far, thank goodness, we have at least one farming asset which has not been affected by the prevailing scourge of our country—disease. Therefore the above heading applies to the bee-keeper and not the bee, as all genuine lovers of the insect know too well.

It is a generally accepted axiom that if you want to succeed in any walk of life it is necessary to put your whole heart into the accomplishment of the particular object attempted: and perhaps in nothing is this more true than in bee-keeping. An indifferent bee-keeper never can and never will make a success; and unless the beginner, when he has gained a sufficient insight into the simpler mysteries of the hive, does not have instilled into his mind a desire to go deeper into those wonderful mysteries (I can give them no more appropriate name), and a greater love of the busy little creatures he had better not make bee-keeping either a hobby or an industry.

Unfortunately with a great many, bee-keeping is looked upon only from its commercial side and if the hive does not yield a handsome return the first season, regardless of every condition, the bees are voted a failure. With the genuine bee-keeper we are pleased to think it is very different, as they are looked upon as the most hopeful beings under the sun. Now

why, we may ask, should bee-keepers be considered as having more of that particular quality than any other craft. The answer to my mind—and I think every bee lover will agree with me—is, that apart from any pecuniary benefit we derive a great deal more genuine pleasure from our bees than from any other hobby we may take up. This statement may appear a bit over-strained to the reader who has never made a study of the inmates of the hive, but the true bee lover will endorse it. To the latter every phase of bee life and instinct is of engrossing interest, from the individual bee as it passes from flower to flower in its eager quest for nectar or pollen, to the crowded hive with its thousands of inmates undergoing the various metamorphoses peculiar to their nature, or, that most singular, and to the human mind, most unexplainable, event of beedom—the swarm.

The enthusiast can always find a charm in the open hive, whether it contains only a tiny patch of brood, the first fruits of the early spring and the promise of a life and hope begun, or, the loaded supers, the fulfilment of that hope that had its birth when spring awoke. To him there is always something new, something absorbing, something more to learn. It may sometimes prove disappointing, what is there that does not? We may sometimes have mishaps, accidents will happen, when we get more stings nor sweets; but bee-keeping never becomes dull or monotonous, and we can never reach a point where we may say there is nothing more to find out.

It has been said more than once that there is no craft under the sun which draws men closer in a bond of brotherhood and mutual affinity than that of bee-keeping, and we know the term "brother bee-keeper" is in general use; and synonomous with an eager love of the craft.

This then is the meaning of the term "Bee-Fever," sometimes applied as a term of derision, but it is an asset without which no one may hope to get the greatest amount of pleasure out of the undertaking. If we look on bee-keeping only as a means of increasing our income, or adding to the luxury of our table—while it often may do both—we have missed the finer and nobler part, that of studying one of the most wonderful and fascinating of all God's creatures.

It must not be supposed that I deprecate the desire to make bee-keeping a financial success; by all means do so to the best of your power and the earnest study and intimate acquaintanceship with the insect itself will be a means to that end.

What I would say to the beginner (and just now there are a great many in the country coming under this class), is first to make yourself thoroughly conversant with the nature and instinct of the bee by an earnest study of the open hive, and on so doing not only does your success as a practical bee-keeper depend, but you will be doubly enriched by the knowledge and pleasure gained from your study.

ISLE OF WIGHT BEE DISEASE.

Extracts from an article on the subject by Walter Malden, M.A., M.D., of the Pathological Laboratory, Cambridge, appearing in the *Journal of the Board of Agriculture*, February, 1909.

History of the Disease.

The disease was apparently first noticed in the south-eastern part of the Island, in the summer of 1904. During the year 1906 it spread very rapidly, and in the spring of 1907 was prevalent over nearly the whole of the Island. Early in May, 1908, it was ascertained that almost all, if not all, the affected stocks had perished, and in consequence there did not appear to be any diseased stocks left on the Island. After a short period of apparent complete absence, the disease appeared again about the middle of June, 1908. In a recent letter, dated 15th October, 1908, Mr. H. M. Cooper says that "most of the old Island strains that were left in the spring seem to have since died."

Symptoms of the Disease.

The disease seems to be confined to adult bees, the brood remaining unaffected and retaining its normal appearance. The earliest sign that bee-keepers have noticed is an apparent disinclination on the part of the bees to do any work. They fly about in an apparently aimless manner and do not gather any stores. Later they gradually lose their power of flight, being often unable to fly more than a few yards without alighting. As the disease progresses, the bees can only fly a few feet from the hive, and then drop and crawl about aimlessly on the ground. They are often to be seen crawling up brass stems, or up the supports of the hive, where they remain until they fall back to the earth from shear weakness, and soon afterwards die. Some bee-keepers assert that the abdomens of the affected bees look darker than normal, and have a greasy or shiny appearance. Others, though on the look out for this symptom, have not noticed it. A considerable proportion of the diseased bees have swollen abdomens, which they are unable to fully extend. The terminal segments droop, and are partly flexed downwards. According to some bee-keepers this is so marked that they are able to diagnose the disease by the characteristic attitude of the bees on the combs before any dead ones are found outside the hives. It has been stated that the diseased bees lose their power of stinging. It has been proved, however, that these bees can sting, but owing to their sluggish and otherwise sickly condition are disinclined to do so. The wings are often dislocated, but this is not always the case. In a badly infected stock great numbers of bees are to be seen crawling over the ground in front of the hives, frequently massed together in little clusters, while others remain on the alighting board. If the hives be opened, numbers of diseased individuals will

often be met with inside. In winter and early spring the diseased bees void their excrement on the floor, walls and alighting boards of their hives.

All observers are agreed in stating that the foragers are the first to become infected, and many have thought that robbers which enter infected hives are the first to be attacked. In hives which have been completely destroyed the last remnant of the colony is generally found grouped around the queen. The latter probably dies from want of attention and not from the disease.

MORTALITY AND INFLUENCE OF SEASON.

During May and June the stocks are frequently destroyed in from two to four weeks, and in one case at least a stock was completely destroyed in nine days. In the winter and spring months the bees die less rapidly. Infected stocks are not invariably destroyed. Occasionally the mortality in a hive suddenly ceases. In some cases a hive may nearly die out and then rapidly recover and fill up with brood, but the hive may become badly diseased later. Hybrid stock appear to be more resistant to the disease than pure home-bred stock. Most bee-keepers who have kept both kinds are agreed that the Italian hybrids are the last to succumb, sometimes surviving for several months after the others have been destroyed.

EXPERIMENTAL EVIDENCE RELATING TO THE TRANSMISSION OF THE DISEASE.

A number of direct experiments and observations seem to show that after a short period the hives and combs are not infective. For example, Mr. J. W. Cooper writes: "I have known combs from diseased hives placed in apparently healthy hives without making any difference to the bees" (two experiments). Other experiments are described, the results of which all bear out the finding of the one mentioned above. The results, however, are quite different when swarms enter infected hives *which still contain a few diseased bees.*

ANATOMICAL INVESTIGATIONS.

Mr. A. D. Imms, the only investigator who has published any account of the anatomical observations on bees affected with this disease, writes as follows:—"The disease is eminently one of the digestive system, and might be described as being an enlargement of the hind intestine. . . The colon and the adjacent parts of the rectum are enormously distended with a congested mass of material, consisting primarily of pollen grains. . . The distended colon exerts pressure on the large abdominal air-sacs of the tracheal system, and so interferes greatly with their function. The insect is therefore unable to expand them with sufficient air, which is necessary for flight, and this feature, coupled with the additional weight in the digestive canal, renders the insect incapable when badly diseased,

of flying about." He shows that the inability to fly is not caused by paralysis of the wing muscles, but states that in the last stage of the disease the bees do not seem to have strength to move their wings at all. He further states that "while the hind intestine is thus gorged with pollen, etc., the stomach and the remaining portion of the digestive canal contain very little solid matter of any description Some amount of a dark coloured fluid is present very often in the chyle stomach, but it is not distended with it. The contents of the rectum and colon consist of pollen grains for the most part, together with a variable quantity of a bright yellow substance in amorphous masses (wax) and a large number of bacteria. There is no individual type of pollen grain common to all bees examined."

In order to ascertain whether the distended condition of the colon was peculiar to the disease, I procured a stock of healthy bees for examination at various times and under various conditions, and also made observations on healthy specimens which were sent to me from time to time. As a result of these observations, I found that the condition of the healthy bee's intestine varies greatly. In fact, all the variations in the condition of the alimentary canal met with in the diseased bees can be seen in healthy bees under various conditions.

If the bees be taken from the hive after a few days' bad weather when they have had no opportunity of leaving the hive, it is found that the colon is distended to quite the same extent as in many diseased bees. On such bees I have conducted a number of careful experiments, with the following results:—The weight of the abdomen in the healthy bee varies between 0·030 grm. and 0·073 grm., and that of the colon between 0·012 and 0·154 grm. The weight of the abdomen in diseased bees varies between 0·03 and 0·06 grm., and that of the colon between 0·009 and 0·036 grm.

The contents of the colon, when voided by the healthy bee and deposited on a dry surface, form a dry brownish mass, similar to that described as occurring on the alighting boards, etc., during the early months of the year in this disease. Bees from the same healthy stock, caught as they returned on a fine day, showed an almost empty colon. Imms seems to have almost overlooked this natural condition.

It has been shown (Cheshire, 1896, Vol. II., p. 148), that bees normally discharge the contents of their bowels when on the wing, with the air-sacs fully distended. Cheshire, in fact, goes so far as to say that they are "structurally compelled" to do so. Nevertheless, Cheshire (Vol. II., p. 524), himself later shows that bees may defæcate without actually flying, for he mentions "that, under certain conditions (*e.g.*, inadequate protection accompanied by continued low temperature), the bees being forced to the before-mentioned vigorous agitation of the abdomen and a gentle flapping of the wings, the bowel becomes loaded

beyond endurance, and the bees, too heavy or too chilled to fly, discharge themselves upon the combs, producing a condition which has been incorrectly described as disenteric."

In the winter and spring the soiling of the hives, which, as I have mentioned occurs in this disease, may be brought about in the way described by Cheshire, since it seems probable that the depleted and diseased occupants of the hive are unable to keep the temperature up to the normal.

These observations show that the distention of the colon cannot be regarded as a condition peculiar to the disease, and I think that in the later stages of the disease, it is far more probable that weakness or disinclination to fly gives rise to overloading of the bowel, than that distention of the colon produces inability to fly. Consequently, I regard the condition of the colon as a secondary effect of the disease.

The only constant difference I observed was the chyle stomach of the affected bees was apparently more easily ruptured. This difference was, however, not very marked, and could not be relied upon in diagnosing the disease.

The results of my gross anatomical investigations, instead of aiding me, greatly increased the difficulty of investigating the disease, since they showed that it was impossible to determine whether any given bee was suffering from the disease, either by clinical signs or by coarse dissection.

A somewhat lengthly and technical report on microscopical and bacteriological examinations is summed up as follows:—Histologically the chyle stomach appears to be the only organ affected, and bacteriologically plague-like bacilli were frequently encountered, in some cases apparently within the epithelial cells. These bacilli were not found either in the brood of diseased hives or the chyle stomachs of healthy bees. For these reasons I am inclined to regard these organisms as the cause of the disease. I am, however, well aware that I have not fully established their relationship to the disease, since I have not been able to demonstrate them in every case either microscopically or by culture, or to find, except in very advanced cases, and very definite lesions constantly associated with their presence. I feel that my inability to discover any means of cultivating the organism with certainty even from chyle stomachs, in which it was present in abundance as shown by microscopical preparations, constitutes the most serious difficulty in establishing its relationship to the disease. By their morphology alone, few pathogenic bacteria can be recognised, since morphologically indistinguishable, but non-pathogenic, organisms are frequently encountered. Consequently, until some satisfactory cultivation methods have been discovered the bacteriological diagnosis of this organism must in most cases remain in doubt, for organisms simulating it in morphology probably exist.

THE PATHOLOGICAL COURSE OF THE DISEASE AND MODE OF INFECTION.

If my observations are correct, the disease must be regarded as an infectious one which primarily affects the chyle stomach. Here the specific organisms multiplies and brings about destruction of the lining epithelium. Judging from the condition of many of the pollen grains found in the colon, this apparently results in the food passing undigested through the chyle stomach. Either for this reason or because the constitutional effects of the disease prevent the bees from flying and voiding their excrement, the colon becomes greatly distended in the last stage of the disease. The actual cause of death is uncertain, but it is probably brought about by mal-nutrition, possibly combined with the absorption of a specific poison and of the products of decomposition in the colon, and probably aided to some extent by imperfect oxygenxation of the tissues, owing to the pressure exerted by the distended colon on the abdominal air-sacs. In regard to the mode of infection and dissemination very few definite statements can be made. There is some evidence to show that foragers, and more particularly robbers of infected hives are the first to be attacked, and communicate the disease to other members of the hive. The organism probably enters by the mouth, and infection may be spread by means of the contents of the honey stomach, or in the later stages by the infected excrement. Whatever the precise means may be by which infection is carried, the adult bees are alone affected, and there is satisfactory evidence to show that after a short period of time neither the combs nor the honey are infective.

TREATMENT AND PREVENTION.

From the nature of the disease it seems scarcely likely that its progress will be arrested by drugs, and, as a matter of fact, most of the recognized medicinal methods of treatment have already been employed by practical bee-keepers without permanent success. Since remedial measures cannot be relied on, but as the infected area (the Isle of Wight) is at present small, an attempt to exterpate the disease completely seems justifiable.

The success of any machine depends largely on who is operating it.

Disease may lurk in that old well that has not been cleaned out for several years. Better attend to it.

East Coast Fever.

THE BLOEMFONTEIN CONFERENCE.

IN the House of Assembly on the 2nd November the Minister for Agriculture stated that the following resolution had been adopted by the East Coast Fever Conference held at Bloemfontein on Friday and Saturday, 29th and 30th of October:—

Proposed by Mr. Malan, seconded by General Botha, that this Conference asks the Ministers present to lay the following resolution before their respective Governments for confirmation:—

"This Conference recommends that the Natal Government be authorised to borrow a sum not exceeding £60,000 for the purpose of dealing with East Coast Fever within the Colony, operations to commence from the western border, subject to the following conditions:—(1) The constitution of an Executive Committee to supervise the spending of this money, the committee to consist of the Minister of Agriculture of Natal and the four Chief Veterinary Surgeons. (2) The policy to be carried out by this committee to be settled by this Conference. (3) This policy to be confirmed by the Natal Parliament."

Mr. Deane moved, and Mr. Malan seconded:—That this Conference requests General Botha to urge upon His Excellency the High Commissioner: (1) The advisability that more stringent measures be taken by the Imperial Government for the eradication of East Coast Fever in Swaziland, and to adopt the policy laid down by this Conference. (2) The advisability to secure from the Imperial Government the *pro rata* contribution from Basutoland towards the £60,000 referred to in the preceding resolution, and if Basutoland contributes its Chief Veterinary Surgeon will be added to the Executive Committee.

Mr. Malan proposed:—That the Chief Veterinary Surgeon and other officers present should meet on October 29th, at 8 p.m., to draw up a policy as outlined in the resolutions adopted by the Conference; such recommendations to be submitted to a meeting of the Conference on Saturday, October 30th:—

VETERINARY REPORTS.

The following was the report of the Veterinary Surgeons:—

Your technical advisers, pursuant with your instructions, have met in committee, and beg to recommend the following scheme, outlined in accordance with the resolutions adopted by the Conference:—

Methods to be taken to cope with East Coast Fever in Natal, and more particularly in the infected areas west of the main line of railway, and in the Division of Utrecht:—(1) Guards should be placed over all

known infected centres, on which cattle shall be counted and branded with a distinctive brand. (2) All infected areas should be fenced with as little delay as possible, farm and location boundaries to be followed wherever possible and desirable. (3) If possible infected herds should be collected and isolated in a central position, where such herds are in the immediate proximity to each other. (4) The removal of meat or skins from infected areas shall not be allowed unless these have been inspected and passed by a duly authorised officer in accordance with the regulations to be laid down. (3) That a sufficient number of competent inspectors should be provided to patrol the areas being dealt with for the purpose of locating further outbreaks of the disease. (6) The Donnybrook-Esperanza Railway should be immediately fenced and guarded, continuing the fence from Esperanza to the sea. (7) All movements of cattle should be immediately prohibited within the area enclosed by the Riverside-Donnybrook, the Donnybrook-Esperanza Railway and the Cape Border. (8) That the Natal Government provide a sufficient supply of mule transport within any area in which all cattle movements are suspended, on the recommendation of the Executive Committee, and that special rates be quoted where necessary. (9) That the infected and in-contact herds in the areas in which these operations are being conducted should ultimately be disposed of in accordance with the recommendations of the Executive Committee.

Infected Areas.

(10) When there is good reason for believing that all centres of infection within the area under consideration have been dealt with, arrangements should be made to modify the restrictions imposed upon movements of stock by the introduction of the permit system; provided, however, that this shall not be done without the unanimous vote of the Executive Committee. (11) Simultaneously with the adoption of the policy outlined for dealing with the disease in the area already mentioned, a special staff of inspectors should be placed in the vicinity of the other infected areas on the west of the main line of railway and in the Utrecht Division, steps at the same time being taken to repair and guard the main line fence. (12) That at least four additional veterinary officers should be added to the present Veterinary Division in order to enable them to carry out this work in an efficient manner.

Mr. Malan proposed that the Conference suggests to the Minister of Agriculture for Natal to submit this policy to his Parliament as soon as possible for confirmation.

Mr. Malan proposed that if any difference of opinion arise between the Minister of Agriculture of Natal and the Chief Veterinary Surgeon of Natal on any point in connection with the carrying out of the policy laid down by this Conference, the Minister, as chairman of the Executive

Committee, shall immediately communicate the facts to the other members of the committee through their respective Ministers.

Mr. Malan proposed that the first meeting of the Executive Committee shall take place not later than two months from the date on which this scheme may be sanctioned by the Natal Parliament.

Mr. Hime proposed that this Conference wished it to be distinctly understood that the special provision of £60,000 is not to be held to relieve the Natal Government from the expenditure of the amounts for which provision has been made in the current Estimates in connection with East Coast Fever.

Mr. Deane proposed that this Conference recommends to the Cape and the Transvaal Governments that they each send two of their veterinary surgeons for the special service in Natal, pending the appointment qualification of the four men referred to in Section 12 of the policy.

Mr. Malan proposed that copies of the minutes and resolutions passed at this Conference be sent to the Governments of all Colonies and Territories represented.

The Minister of Agriculture intimated to the House that he intended to move a resolution at a later date. In the meantime hon. members would have an opportunity of discussing the matter which had just been read.

Hodder's Water Elevator.

A NEW INVENTION.

WE have received particulars of an interesting new invention consisting of an apparatus for raising water or other fluids to any desired height without the aid of any motive power other than that developed by the fluids flowing through the apparatus. It works automatically and continuously without any attention so long as it is supplied with water or other fluids. It is altogether different from a ram and deals with large volumes of fluids.

The power operating this apparatus is compressed air, which is obtained by water flowing over an aerator, and carrying air in bubbles down a pipe to a closed cylinder which is situated at a distance below the source equal to the distance to which the water is required to be raised above the source.

The water on arriving in the cylinder gives up the air which is

compressed in the cylinder by the weight of the falling water and the weight of the water as it returns up another pipe to within four feet of the source.

The compressed air is conveyed in another pipe to one of two displacement cylinders which is filled with water, or the fluid required to be raised, and discharges the contents to the height desired.

Whilst this displacement cylinder is being discharged the other one alongside it is being filled, and as soon as the first one is emptied a valve controlling the compressed air is automatically changed over to the other displacement cylinder which has been filled, and its contents emptied whilst the first displacement cylinder is being refilled; the filling and emptying goes on continuously

These displacement cylinders can be fed from the same source as the power water or from another source. Thus where water is available it can be used to raise sewage, sludge, oil or other fluids; sea water can be used to raise fresh water

The displacement cylinders can also be used with a steam plant for raising sewage, sludge, etc., as well as raising water.

The only moving parts of this apparatus are metal valves, there being no leather or rubber to wear or get out of order.

Where water is abundant, such as in a river or the sea, immense quantities of water can be raised and the same effect produced as is obtained at the Niagra Falls and other falls for power purposes.

The capital outlay in erecting this apparatus is considerably less than the present system of steam power, there being no engine-house, engines and boilers to provide, and the working expenses are merely nominal—there being no fuel required, nor engine drivers or stokers. One man can easily superintend a very large installation.

The elevator can be used for the following purposes, viz.:—For irrigation, at a comparatively small capital outlay, and when erected and set to work will continue with slight supervision. For draining purposes, in raising sewage to different levels, in place of the large pumps now in use with the attendant engines, boilers, etc. For unwatering mines when a head of water is obtainable. For conveying oil in pipe lines, by raising it to a higher level and thence following by gravitation. For purposes of power in conjunction with a turbine where stationary engines are now used, doing away with engines, engine houses, boilers, coal, oil, engine drivers, stokers, etc. By water works for raising water to different levels instead of the present costly pumps with the necessary engines, boilers, etc. By the use of this apparatus water works companies are in a position with the enormous supply of water at their command to utilise the water for supplying power and electricity and afterwards return the water into the reservoir to be used for its present purposes.

Maize Export.

SHIPMENTS TO DATE.

IN our last issue we published a statement showing the numbers of bags of maize shipped oversea from Port Natal during the nine months ending with September; and as information of this nature will probably be found of interest and of value by a considerable section of our readers we propose to bring these figures up to date month by month, by means of weekly statements which are being supplied to us by the Railway Department. The figures we have received up to the date of going to press enable us to bring the statement forward to the 13th November.

The figures in the statement which follows include shipments to Cape ports.

EXPORT OF MAIZE.

Statement showing Number of Bags of Maize exported through Port Natal from 1st January to the 13th November, 1909, from Natal, Orange River Colony, and Transvaal Farms.

Maize Received from —	Shipped to 30-10-09.	Shipped during week ended—		Total Shipped to Date.
		6-11-09.	13-11-09.	
Natal—	Bags.	Bags.	Bags.	Bags.
Main Line		6,176	4,178	
South Coast Line ...		...	...	
Richmond Line		3,126	3,119	
Cape-Natal Line ...		1,727	1,652	
Stuartstown Line ...		1,250	2,150	
Greytown Line		4,459	7,244	
Estcourt-Weenen Line ...		...	...	
Upper Tugela Line ...		3,433	2,651	
Loskop Line		...	...	
Total for Natal	234,386	20,171	20,994	275,551
Orange River Colony ...	468,439	9,565	3,807	481,811
Transvaal	96,950	2,778	1,440	101,168
GRAND TOTAL ...	799,775	32,514	26,241	858,530

Sulphur sprinkled about the barn, in the crib and in stacks of grain is recommended to drive rats and mice away.

Division of Agriculture and Forestry.

REPORT FOR OCTOBER, 1909.

The past month has been a busy one at all stations. The compulsory sale of all working cattle from Cedara, occasioned by the detection of a single case of East Coast Fever, has necessitated the thorough overhauling of the traction engine after seven years' continuous service, with a view to its employment in a steam-ploughing outfit. The greater part of the area already under cultivation will be ploughed in this way before Christmas, and an additional acreage broken up to meet an increased demand for winter feeding crops due to recent acquisitions of sheep and mares for mule-breeding. The dairy herd, which is being stall-fed until such time as the risk of further infection may be at an end, continues healthy, and an opportunity is being found in such compulsory stalling for a continuance of a series of feeding experiments. The value of different leguminous meals, such as those of soy bean, cow peas, velvet beans and broad beans, as milk-producers is now being determined. Eight eland calves of this season's catching have been delivered and are thriving well. The two-year-old eland are now being broken to harness. Silage crops of maize, teosinte, and Japanese and bulrush millet have been planted, and extensive plots of soy beans, potatoes, beggar-weed, etc., are above ground. The month has been exceptionally dry and rain is badly required. Further planting of mangolds and maize have been consequently postponed. Autumn-planted green manure crops of buckwheat, lupins and vetch have made good development and are now ready for the plough.

WINKEL SPRUIT EXPERIMENT FARM.

The manager, assisted by five students, is still busily engaged in harvesting the cane crop from some 120 acres, and about 30 tons per diem is being delivered by tramway to the Illovo Mill. It is estimated that this work will be completed early in December with a total delivery of at least 2,000 tons. The resulting revenue will cover the entire working expenses of the Station for the year, exclusive of sums derived from other sources.

WEENEN IRRIGATION STATION.

The month of October has been very dry at this Station, with a high range in temperature, the maximum record reaching on several occasions 100 degs. F. The partial drought has necessitated liberal irrigation of cereal crops, orchards and lucerne fields. All fruit is running smaller in size as a consequence than last season.

All varieties of winter barley except one have now been harvested,

Manitoba being the first to mature, followed by Algerian, Gaza, Damascus and Brewing in the order named. Most of the grain is of a good malting sample, and the thrashing results will be available next month.

Yorkshire Hero peas have again yielded about 2,000 lbs. of clean grain to the acre.

The wheat on the two new blocks is ripening very fast, with the Federation leading. The latter type should be off the ground by the 8th November. The Standard Fife will be at least twelve days later. On the Quantity of Seed Plots, from present appearance, that receiving 40 lbs. of seed promises the best results. On the Manure Plots wheat which received 200 lbs. superphosphate is standing 5 ft. 6 in. high, with well-formed ears, while that on the unmanured plots does not exceed 3 ft. in height.

In the Variety Plots, Menenieu from our own seed stands out in superiority, whilst the newly introduced American varieties already show considerable rust.

EMPANGENI STATION.

A first tapping of rubber from the Ceara plantation will be taken as soon as the partial drought has broken. The limit of profitable wattle cultivation would seem to have been reached at this centre, black wattle making little or no growth despite good rains received in the early spring. Cocoanuts, after hanging fire for some seasons, now promise to make better development. Trial is to be afforded to several types of Macaroni or Durum wheats at this Station, at the instance of Johannesburg firms interested in the manufacture of edible pastes. The climatic conditions obtaining at Empangeni approximate closely to those of the Durum wheat belt in Algeria.

WOOL EXPERT'S REPORT.

In connection with his work for the month, the Wool Expert, Mr. J. J. McCall, reports as follows:—

"On the first of the month there were 1,131 sheep under my charge on the Farm. At the beginning of the month I went to Ladysmith, accompanied by a student, where I gave a lecture and demonstration in the preparation of wool for market. On my return I had the various flocks yarded and had them round-tailed and hoof-trimmed. I found the maggot-fly very troublesome as they affected the sheep to a considerable degree, owing to the young green grass which caused scouring. On the 4th, I went *via* Nottingham Road to Insinga and Loteni, giving a demonstration at the latter place on the 5th at Mr. Brooke's farm. I visited two other farms and gave advice at both places on the sheep. Returning to Cedara on the 6th I erected a draining pen at the dip so as to minimise the loss of dip as much as possible. On the 11th I attempted to commence the shearing of the flock, but I was hampered by the lack of shearers. On the 13th I gave a demonstration at Mooi River, and

then visited Southdowns, where I gave an object lesson in culling and classing sheep. On the 15th I procured additional shearers and made better progress with the shearing. From this date until shearing was completed all the students had an opportunity of practical experience in shearing, picking up fleeces, throwing them on the wool table, skirting, classing and packing. One and all seemed pleased to obtain the opportunity thus afforded of learning the up-to-date method of handling wool. Shearing was completed on the 26th and the wool was forwarded, 15 bales and 1 bag, direct to Messrs. Reid & Acutt's, Durban, for sale on the 3rd November, the balance, 6 bales, were sent to Umlaas Wool Washery to be scoured previous to sale. It is the intention to allow a party of students from the College, under my guidance, to attend this sale to gain further experience in the wool industry.

"During the month the flocks have done very well owing to a plentiful supply of green grass. With a few exceptions they were in very low condition owing to the hardships they had undergone prior to our obtaining delivery. There were a few of them lambing and in lamb, and of those three died during the month. We had several cold, wet nights, and the present lack of shelter, which will be remedied shortly, has been a considerable drawback to my obtaining the best result in the management of the sheep. I have had covered salt troughs placed out in the paddocks containing Liverpool salt. It is my intention, once the sheep have taken to the lick, to add either Stockholm tar or some other compound which may tend to repel the ravages of intestinal worms so prevalent in this district during the winter months.

"I am also dipping at frequent intervals, to minimise the danger from the bont-tick, the cause of heart-water in sheep

"I am now in possession of 1,000 doses of vaccine for the prevention of blue-tongue, obtained from the Laboratory of Dr. Theiler, Transvaal, by your directions, and I shall inoculate, say, 50 sheep, comprising small lots from each flock, as a preliminary to inoculating the balance, with a view to watching the effects of the vaccine so as to avoid possible disaster.

"I have classed the Merinos—ewes and rams—into three grades, according to quality, and have branded them accordingly. Having more rams than we can profitably use on the Farm, it will be possible to dispose of some to advantage.

"I can only speak with satisfaction of the way the work has been carried out by the students under my charge. A special word of praise is due to student Reid for the painstaking way he handled the wool in my absence from the Farm.

"It may be satisfactory to state that four of the 25-acre paddocks, used in rotation, carried 10 sheep to the acre for five weeks without unduly hurting the vegetation. I have now eased those paddocks off for

three weeks, to allow the grass to obtain a good start when I will replace the flocks, at the same time putting the rams with the ewes.

"Before closing this report, I may mention that it has been my custom to invite farmers to communicate with me on any matters concerning their flocks or wool. In response to this invitation quite a few of the farmers have asked for my opinion and advice. Where I have been notified, I have always communicated with the wool brokers requesting their assistance in drawing buyers attention to the clips where an honest attempt has been made to get it up properly. I annex an extract from a letter from one of the brokers which was elicited by a previous one from me on the foregoing subject. I would beg to emphasize the remarks made therein *re 'tendency towards cross-bred strains'* as this tendency has been impressed upon me during my recent visits to the various districts."

EXTRACT.

"We note your remarks with regard to the two clips for the Loteni district, and you may rely upon our bringing to the notice of the buyers the way in which these clips have been got up. It has been our ambition for many years, and we are continually advising growers on the desirability of getting up their clips in a better manner, and there is no doubt that each year a decided improvement is noticeable. But the one thing which worries us now is the fact that nearly all the best Merino clips are showing a tendency towards the cross-bred strains, and the number of really fine Merino clips seems to be getting less every year. We have before this pointed out in our reports the excellent work done by the Australian classers, and you may always rely upon our doing our best to second your efforts."

FOREST CONSERVATION.

The Chief Forest Officer, Mr. G. H. Davies, summarises the month's work in Crown Forests as follows:—

Foresters Tustin and Chilvers report having transplanted seedling trees from places where abundant to areas destitute of them in Impetyene and Zuurberg Forests respectively. The season is rather young for this, especially in view of the drought generally reported elsewhere, but conditions may be more favourable at the Ingeli. Forester Foster notes that a clearing in the 'Ngomi which he has specially protected is being rapidly regenerated by self-sowings. Our native bushes are so vigorous that I believe that they would recover from all the injuries done in the past (wherever the veld has not established itself) if simply protected from fire and improper felling. This, however, would be a slow process and requires the assistance of the Forester in judicious sowings and trans-

plantings, both to hasten results and to give the best timber the advantage. The Forester should use discrimination in this work: noting the species of most value flourishing near to the area to be treated as an indication that such species is most likely to succeed there. Introductions of kinds not found in the vicinity should be on a smaller scale as experiments.

Alienated forest is beyond our reach, however vigorous its regenerative powers may be, and past experience does not conduce to hopefulness about the fate of natural forest handed over to private owners. Impecuniosity, greed, and carelessness are rapidly reducing native bushes on farms to patches of scrub in inaccessible ravines, protected by rock and water from fire, and the veld has covered the sites of many ancient woods. In this connection Forester Leigh reports that the portions of the Entumeni Forest, so inadvisedly included in the European Settlement Reserves of Zululand, are being quickly cleared by native tenants and labourers for mealie gardens. The soil around is just as good for the purpose, but requires a little more cultivation and manuring to yield the speedy but temporary richness of cleared bush soil. The Foresters' report on the bushes on these alienated lots has been sent to you, but it is probably too late to prevent a mischief which could only have been provided against by including a representative of the forestal interests of the Colony in the original Delimitation Commission of Zululand.

Forester Fernando has completely marked up the two Xalingena sections near Riverside, and when the cumberers in B have been ringed they will both be in good order for final clearing. Forester Chilvers has done the same for the A section at Ingeli and started on B, but I have not as yet instructed him to ring in either. Owing to absences of the former Forester on military duty and the necessity of securing a substitute in a hurry, trees were marked beyond the intended boundaries of these sections, which are thus unduly large. This would have righted itself if the demand had kept up, but East Coast Fever has left on our hands a number of marked trees scattered over large areas, and I propose to leave the ringing of the cumberers in them until the sap is down next winter. Incidentally, Forester Chilvers finds that a copying-pencil makes as lasting a figure on trees as red lead, but thinks blue paint more permanent than either. When sections are in full working the pencil should be sufficiently lasting, and is, of course, much simpler to handle. Both Foresters have sent you various tree seeds—including those of *Ekebergia capensis*—during the month. Remarking on the Elœodendron, Forester Fernando points out that *Capensis* yields as good timber as *Croceum* (No. 14 of Reserved List), of the same character and known by the same vernacular names of Saffron and Umbonvane, and that it is equally deserving of protection. This division of timbers—many of unknown utility—into reserved and unreserved is of necessity tentative, and only

necessitated by the native demand for hut-building materials. The increasing plantation of acacias is rapidly decreasing this demand as far as Crown forests are concerned, and some day all the natural timber-bearing agencies may be classed as equally under protection.

Forester Fernando has prepared for the bamboos which are to be experimentally planted at Emkazeni, as an alternative to acacias for wattles and poles for native use. The bamboo is one of the most useful of all plants, and its general cultivation will be of immense service for many purposes besides hut-building, in which it must become easily chief of all materials.

In October, fires damaged bush both in the Ingwangwane and Alexandra Forest districts, Forester Cruickshank reporting one at the Hlogozi—non-demarcated—Forest, and Forester Fernando two in his forests. The latter thinks that this is due to mere carelessness, and suggests that remonstrance from the Department of Native Affairs—say through Magistrates or Native Commissioners—might prove effective. I think that a spirit of wanton mischief, incited by the evidences of care taken to protect bush by fire-lines, has something to do with it, and I should like to hear of a few offenders caught and whipped or fined. The "umfaan" and "insizwa" have much of the monkey in them. Forester Cruickshank is unable to discover the perpetrator of the Hlogozi fire, but has been prosecuting several natives for minor contraventions, and I met him at Umzinto so engaged.

Eland at Giant's Castle are now formed into large troops for the summer. Guinea fowl are greatly increasing along the Berg, according to Forester Moller. Forester Symons reports his discovery of a cave near the Witteberg boundary of the Game Reserve, containing human bones, earthenware, and a carved stool, which he thinks to be relics of the Langabaleli rebellion. If not required at the Museum, these should be preserved at the Forest Lodge for exhibition to visitors. Forester Foster had an analogous find in the 'Ngomi: a sack containing a human leg bone, with other "drugs" of the native pharmacopœia, which, however, was of no historic importance, and handed over to the Natal Police as effects in the intestate estate of the late forest guard recently sentenced for the murder of an old woman for medicinal purposes.

THE CHEMICAL LABORATORY.

The Chemist, Mr. W. R. S. Ladell, reports that during the three months—August, September and October—60 samples have been received in the Chemical Laboratory, over 50 of which have been reported on. The chief feature of the work was the large number of soils examined, the exact figure being 26. A few supposed phosphatic rocks were analysed,

with disappointing results. It would be quite a relief to come across a really good sample of phosphate, but they appear to be few and far between.

Twenty-four samples of soil gave the following results:—

COMPOSITION % AIR-DRIED SOIL.

Description.	Available Potash.	Available Phosphoric Acid.	Moisture.	Organic and Volatile Matter.	Silica and Insoluble Matter.	Total Phosphoric Acid.	Total Potash.	Iron and Alumina.	Lime.
Soil from Braemar ...	0·027	0·0022	3·1	10·4	78·2	0·042	—	—	0·120
Subsoil from Braemar ...	0·016	0·0019	3·0	10·5	78·6	0·032	0·087	—	0·145
Lower subsoil from Braemar	0·009	0·0027	1·2	2·7	87·8	0·019	0·142	5·3	0·118
Red soil, Highflats ...	0·009	0·0047	4·2	17·7	62·7	0·106	0·127	20·4	0·095
Soil, Highflats	0·015	trace	1·6	2·5	94·0	0·012	—	1·5	0·119
Subsoil, Highflats ...	0·028	trace	6·0	15·3	46 2	0·064	0·151	31·2	—
Clay soil, Highflats ...	0·012	0·0032	3·4	13·4	66 1	0·040	0·084	12·3	0·276
Sandy soil, Wilgevreden ...	0·025	0·0027	0·2	3·2	89·0	0·050	0·053	4·0	0·056
Soil, Wilgevreden ...	0·017	0·0047	0·8	3 0	92·4	0·049	0·096	2·9	0·056
Mountain soil, Wilgevreden...	0·027	0·0041	5·0	21·8	42·9	0·080	0·250	30·9	0·226
Soil, Thring's Post ...	0·005	0·0032	1·6	5·5	89·5	0·040	0·004	6·9	0 070
Red soil, Thring's Post ...	0·009	0 0015	5·0	16·7	53 9	0·090	0·005	26·7	0·070
Sandy soil (Compensation	0·006	0·0019	0·56	0·64	97·9	0·030	0·014	6·8	0·120
Black soil) Flats	0·009	0·0027	7·3	12·1	67·1	0·070	0·003	10·5	0·120
	0·002	0 0022	2·7	5·1	86·7	0·047	0·025	3·0	0·150
Soils from	0·003	0·0021	1·1	4·6	89·8	0 057	0·051	1·1	0·100
Ladysmith District	0·002	0·0027	1·2	2·1	90·0	0·043	0·038	3·2	0·070
	0·003	0·0034	1·6	4·6	89·0	0·049	0·056	3·8	0·120
	0·004	0·0014	0·7	4·7	90·3	0·047	0·137	5·6	0·140
Durban District ...	0·010	trace	0·64	1·0	94·0	0·033	0·019	4·1	0·084
Ladysmith District ..	0·008	0·021	1·7	6·5	78·9	0·104	0·009	11·1	0·119
Helpmakaar (1)	0·019	0·004	3 7	0·9	88 5	0·042	0·063	5·9	0·153
Helpmakaar (2)	0 010	0·004	4 8	8·8	58·0	0·070	0·040	19·5	0·120
Hermansburg	0·010	0·005	1·9	5·1	81·5	0·070	0·083	10·9	0·052

Partial Analyses of Soils in Relation to Fertility.

The soils are extracted for a week with a one per cent. solution of citric acid. The extract is then filtered and the quantity of potash and phosphoric acid is estimated in the solution. The citric acid acts almost in the same way as the acids which are secreted by the root hairs of the plant, so that the quantity of chemical foodstuffs which the citric acid dissolves is a measure of the quantity which the plant will be able to extract from the soil and absorb for its own nutrition.

	Moisture.	Available Potash.	Available Phosphoric Acid.
Soil from Ingogo ...	2·9 per cent.	... 0·019 per cent.	... 0·0014 per cent.
Soil from 'Ngomi ...	3·5 per cent.	... 0·017 per cent.	... 0·0180 per cent.

A few rocks were examined, with the results given below:—

PERCENTAGES.

Locality.	Silica and Insoluble Matter.	Moisture and CO_2.	Iron and Alumina.	Lime (CaO).	Phosphoric Acid (plus).
Ladysmith 1) ...	70·9	5·4	8·0	0·56	0·153
Ladysmith (2) ...	85·0	4·9	7·3	0·62	0·175
Tweedie	27·7	...	...	...	2·5
Weenen	23·4	...	...	...	1·73
Harden Heights ...	...		...	...	2·46

Some samples of limestone were analysed, but none of them proved to be of any great value.

PERCENTAGE COMPOSITION.

Locality.	Silica, etc.	Moisture.	Carbon Dioxide.	Iron and Alumina.	Lime (CaO).	Magnesia and Alkali.
Newcastle	35·3	1·6	34·4	5·4	*4·8	18·5
Weenen	21·2	...	...	6·6	†11·8	...
Estcourt	12·2	2·0	35·4	12·0	‡8·5	29·9

	Per cent.
* Corresponding to Carbonate of Lime ...	8·6
† ,, ,, ,, ...	21·0
‡ ,, ,, ,, ...	15·3

A sample of shale from Dundee was examined with the following results:—

	Per cent.
Moisture	7·1
Organic Matter	64·5
Silica and Insolulbe Matter ...	25·9
Phosphoric Acid	0·02
Unestimated	2·48
	100·00

Experiments were tried with a view to obtaining tar or oil from this shale, but it was found to be unsuited for the purpose.

Some wattle tar has been distilled on a moderately large scale, and I hope that I shall find time to examine the resulting oils in the near future.

WATTLE BARKS.

	Total Soluble Solids. Per cent.	Non-Tannins. Per cent.	Tannins. Per cent.
From Midlands	47·2	21·9	25·3
	45·0	21·7	23·3
	50·2	18·3	31·9
	53·2	20·2	33·0
Various Sources	26·4	19·5	6·9*
	32·1	20·7	11·4*
	40·7	15·4	25·3
	49·2	19·6	29·6

* The source of these barks is not known; probably they have been obtained from very young trees.

Samples of sugar beet seeds were tested as to their germinating properties. The following varieties were so examined:—

	Percentage of Germination.
White French	7·1
White Top Distillery	8·8
Grey Top Distillery	9·0
Green Top Distillery	7·3
Yellow Top Distillery	6·1

Two new preparations of maize, received from the Natal Mill and Elevator Company, were examined with interesting results. The average composition of the maize grain is given for the sake of comparison:—

	Pollard. Per cent.	Hominy Feed. Per cent.	Maize. Per cent.
Moisture	10·3	9·7	13·5
Ash	3·2	2·9	1·4
Fat	5·3	15·6	4·9
Crude Fibre	3·0	2·4	1·7
*Albuminoids	21·3	11·6	10·7
Total Carbohydrates	56·9	57·8	67·8
†Nutrient Ratio	1 : 3·3	1 : 8·0	1 : 7·4
‡Nutrient Value	90·4	105·3	89·4

* Nitrogen multiplied by 6·39

† Ratio of albuminoids to "starch" and "starch equivalent" of fat, *i.e.*, fat × 2·3

‡ Sum of Albuminoids, "starch" and "starch equivalent" of fat.

The chief difference between the Pollard and Hominy feed is that the former contains more albuminoids and less fat.

The Hominy feed appears to have been formed from the mealies by increasing the proportion of fat, and the Pollard obtained by increasing the proportion of albuminoids. Both these foodstuffs have a high nutrient value, and should prove useful articles of diet.

E. R. SAWER,
Director, Division of Agriculture and Forestry.

Central Experiment Farm, Cedara,
16th November, 1909.

East Coast Fever Regulations.

RECENT NATAL ORDERS.

During the past month a few fresh regulations and orders have been made by the Minister of Agriculture in connection with East Coast Fever, the chief area affected being Zululand. Government Notice No. 576 prohibited, from and after the 1st December, 1909, the removal of hides, horns, hoofs, hair and heads of cattle, cut grass, manure, litter from places where cattle are kept, and lucerne or other fodder, from, into, or within the Province of Zululand, except on permit granted by the Chief of the Veterinary Division, or by an officer of the Veterinary Department authorised by him to issue such permits; whilst, by Government Notice No. 581, the Minister of Agriculture also orders that from and after the 1st December all permits issued by Advisory Committees or Magistrates, or by Permit Officers appointed by Committees or Magistrates, for the removal of cattle, hides, hoofs, horns, hair and heads of cattle, cut grass, manure, litter from places where cattle are kept, and lucerne or other fodder, into, from, or within the Province of Zululand, shall be cancelled and become null and void.

In terms of Section 3 of Act No. 54, 1906, the Minister of Agriculture orders that, from and after the 1st December, 1909, no movement of cattle shall be allowed into, from, or within the Province of Zululand. Notwithstanding this prohibition, however, healthy cattle intended for immediate slaughter may be moved within the said Province on permit granted by the Chief, Veterinary Division, or by an officer appointed by him to issue such permits, and in special cases where it appears to him desirable, the Chief, Veterinary Division, or an officer appointed by him, is authorised to issue permits for the removal of other cattle within the said Province, and into the said Province from Vryheid and Ngotshe Divisions, or from the said Province into the Vryheid and Ngotshe Divisions, subject to such conditions as he may see fit to impose: removal to be made within the time and according to the directions contained in the permit, and not otherwise. The penalty for disobeying this order is a fine not exceeding £100, or imprisonment with or without hard labour, and with or without the option of a fine, for any period not exceeding six months. All orders heretofore issued, in so far as they are in conflict with this order, are superseded by the new order.

The farm "North Welton," belonging to Mr. Morphew, situated in the Impendhle Division, has, for the purpose of the East Coast Fever Acts, been declared to be a portion of the Magisterial Divisions of Lion's River, and all restrictions or regulations which now or hereafter may be in force in the Magisterial Division of Lion's River shall, in like manner, be in force as regards the said farm.

CAPE REGULATIONS.

Two Proclamations have been issued by the Cape Government regarding East Coast Fever. According to the first one, from and after the 11th November, 1909, the district of Bizana shall be taken and deemed to be a suspected district, and the following regulations will have the force and effect of law, *viz.*:—(1) It shall not be lawful to remove, or cause or allow to be removed, or permit to stray, any horned cattle from or into the said district of Bizana, or, except as set forth in Clause 4 hereof, from or into any of the areas within the said district defined in the schedule hereto. (2) If any horned cattle be removed or introduced or permitted to stray into the district of Bizana from any of the adjoining districts of the Transkeian Territories or *vice versa* or, except as set forth in Clause 4 hereof, from or into any of the areas within the said district defined in the schedule hereto, it shall be lawful for the headman of the location in which such cattle may be found to take them in charge with a view to isolating them as completely as circumstances permit, and to detain them in such isolation until such time as the Resident Magistrate of the district or other officer appointed thereto by him in writing, shall, after due enquiry into the circumstances of their removal, introduction or entry, issue instructions for their disposal, and such cattle shall be disposed of in accordance with such instructions. (3) It shall not be lawful to introduce any transport wagons or goods into the said district of Bizana, save and except through the port of entry established at Nqabeni Drift, provided that the horned cattle which have drawn such wagons or goods thither shall first have been outspanned on the Flagstaff side of the boundary, and that such horned cattle shall not themselves be introduced or utilised for the introduction of such wagons or goods into the said district. (4) Notwithstanding anything to the contrary in the preceding regulations contained, it shall be lawful for transport cattle in yoke, within the district of Bizana, to proceed from or into any of the areas defined in the schedule hereto, provided the owner or person in lawful charge of such cattle shall have previously obtained a permit from the Resident Magistrate of Bizana, Government Veterinary Surgeon or officer duly authorised by such Resident Magistrate to issue such permit. (5) Such permits shall specify the number of transport cattle to be removed, the place from which they are supposed to be brought and the destination to which they are proposed to be removed, and, as far as practicable, particulars of the marks and description of the said cattle. (6) It shall be lawful for the Resident Magistrate of Bizana, Government Veterinary Surgeon or other officer as aforesaid, in the exercise of his discretion, to refuse to issue any permit under the foregoing regulations, or, before issuing such permit, to require proof to be adduced that the transport cattle sought to be removed are free from disease and

have not been removed from or through any area declared or proclaimed to be infected. (7) It shall not be lawful for any human being, animal, article or thing, to cross the border from the district of Bizana into the Colony of Natal save and except through Middledrift, at which place human beings on foot shall be permitted to cross the border with their personal effects. (8) Any person contravening any of the provisions of the foregoing regulations, or any person, being the holder of a permit, removing transport cattle in excess of the number or cattle other than those therein specified, or any person obtaining a permit under false representations, or interfering with or molesting any police officer, headman or other duly authorised person in the performance of any duty imposed by this Proclamation shall be liable on conviction to a fine not exceeding fifty pounds sterling (£50) or, in default of payment, to imprisonment, with or without hard labour, for any period not exceeding three months, unless such fine be sooner paid.

The schedule to the above Proclamation defines the boundaries of the following twelve areas:—No. 1, Comprising Jwili's, Pata's, Zulu's, Mjanyelwa's and part of Mpekwas' Location, and Bizana Commonage; No. 2, comprising Lobengulo's, Maxola's, Nkweyi's, and part of Patekile's Locations; No. 3, comprising part of Baleni's and part of Patekile's Locations; Nos. 4 and 5, comprising part of Baleni's Location; No. 6. comprising Mlindazwe's Location and part of Baleni's; No. 7, comprising Jama's and Mapini's Locations; No. 8, comprising Langasiki and Fungus' Locations; No. 9, starting from the junction of the Mzamba and Ncingo, up the latter to a valley running down from Mahashi's kraal close to main road to Middledrift, up this valley to the main road, along the main road to Nkantsweni kopje, down the Sikindanja stream to its junction with the Nqabeni, thence down the Nqabeni and Swane to its junction with Mount Ayliff stream, up Mount Ayliff stream to its eastern source along the ridge road to a vlei lying between the sources of the Izizityana and Mngolovu, down the Izizityana to its junction with the Mzamba, down the Mzamba to first point mentioned; No. 10, comprising Hlamandana's and Gazula's Locations; No. 11, comprising Magquzumana's and Ntusona's Locations; No. 12, comprising Ntlozela, Mbono's Locations and part of Billy's and part Mpikwa's Locations.

By the second Proclamation, from and after the 11th November, 1909, the district Umzimkulu shall be taken and deemed to be a suspected district, and that the following regulations shall have the force and effect of law, *viz.*:—(1) It shall not be lawful to remove, or cause or allow to be removed, or permit to stray, any horned cattle from or into, or from one place to any other place within, the said district of Umzimkulu, without a permit being previously obtained from the Resident Magistrate, either of the district of Umzimkulu or of the district from which it is proposed to remove such cattle, or from a Government veterinary surgeon,

or from an officer duly authorised by such Resident Magistrate to issue such permits. (2) It shall be lawful for such Resident Magistrate or Government veterinary surgeon or other officer as aforesaid, in the exercise of his discretion, to refuse to issue any permit under the foregoing regulations, or before issuing such permit to require proof to be adduced that the cattle sought to be removed or introduced are free from disease and have not been removed from or through any district or area declared or proclaimed to be infected. (3) Such permits shall specify the number of cattle to be removed, the place from which they are proposed to be brought and the destination to which they are proposed to be removed, and, as far as practicable, particulars of the marks and description of the said cattle. (4) Notwithstanding anything to the contrary in the preceding regulations contained, it shall be lawful for owners of farms in the district of Umzimkulu, who own farms immediately contiguous thereto but situated in an adjoining district, to move their cattle to such contiguous farms (but not to farms owned by them contiguous to the latter), and *vice versa,* provided that such cattle shall not be removed beyond the boundaries of such farms in the adjoining district. (5) Any person removing, introducing, or permitting cattle to stray or to be removed from or into the district of Umzimkulu, or from place to place within the said district, without a permit under these regulations, or any person, being the holder of a permit, introducing or removing, or causing to be introduced or removed, cattle in excess of the number of cattle other than those therein specified, or any person obtaining a permit under false representations, or interfering with or molesting any police officer, headman or other duly authorised person in the performance of any duty imposed by this proclamation, shall be liable on conviction to a fine not exceeding fifty pounds sterling (£50) or, in default of payment, to imprisonment, with or without hard labour, for any period not exceeding three months, unless such fine be sooner paid. (6) If any horned cattle be removed or introduced into the district of Umzimkulu from any of the adjoining districts of East Griqualand without a permit under these regulations, it shall be lawful for the headman of the location in which such cattle may be found to take them in charge with a view to isolating them as completely as circumstances permit, and to detain them in such isolation until such time as the Resident Magistrate of the district or other officer appointed thereto by him in writing shall, after the enquiry into the circumstances of their removal, introduction or entry, issue instructions for their disposal, and such cattle shall be disposed of in accordance with such instructions.

Keep the axles clean and oiled; dry or clogged axles add double or treble the work of a team.

Science and the Farmer.

NOTES OF INTEREST BY FARMING EXPERTS.

A PRUDENT man, seeking land, should not take more than his means will allow him to cultivate in the best manner; for instance, if he has only money enough to buy cows or pigs, and everything necessary for ten acres, he will act foolishly if he takes fifteen.—*Martin Doyle and John Darton* (*"Cottage and Dairy Farming"*).

FORM OF COWS.

These should be of good shape and proportion, the head small and square, eyes large and bright, shoulders narrow, back level, rump well formed, haunches wide, thighs round, the udder not too long, round, elastic, and covered with silky down.—*Thos. J. Hord* (*"Milch Cows"*).

THE ORCHARD.

The best situation for an orchard or fruit garden is a gentle slope towards the South, South-East, or East. A north aspect should be avoided, and a West aspect is too much open to tearing winds, and too burning in the afternoon heat to be beneficial. A low, damp situation should be avoided, as no trees will do well and produce fine fruit if its roots are occasionally in water. At the same time a low, sheltered spot, if dry, is better than exposed high land, being less open to cold and violent wind.—*E. Watts* (*"The Orchard and Fruit Garden."*).

LOAM SOILS.

It has been demonstrated by practical experiments that one hundred pounds of sand will absorb twenty-five pounds of water; one hundred pounds of loam forty pounds; one hundred pounds of clay loam fifty pounds; one hundred pounds of clay seventy pounds. This explains why some soils always appear drier than others, why some soils will stand a drought so much longer than others, and why after an irrigation some soils become like a thick paste while others are dry. Sandy soils usually break up loose and mellow when dug, forked or worked in any way; black land is stiff, breaks up in hard clods when worked either too wet or too dry, and requires more cultivation both before and after plants are put in than does sandy soil.—*Lute Wlicox* (*"Irrigation Farming"*).

Cream.

In raising cream by the various setting methods, the milk should be carried to the dairy as warm as possible from the cows, and at once strained into the pans or creamers, which should be kept at as low a temperature as possible (above 40 degs. F.), whether by the aid of cold air, ice, or water. When milk is subjected to a rapidly falling temperature, as, for example, when it is set at 90 degs. F. in a dairy of a cold creamer at 45 degs. F., the cream rises with great rapidity. The reason is chiefly owing to the fact that fat, which forms the bulk of cream, has a lower specific gravity than the remainder of the milk.—*James Long and J. C. Morton* (*"The Dairy"*).

The Function of Fertilisers.

The prevailing opinion in purchasing fertilisers is that they contain a certain amount of plant-food—usually nitrogen, phosphoric acid, or potash—in a more or less available form, and that the benefits received from their application is due to the addition of this plant-food to the soil. So deeply seated is this theory that all fertilisers are bought and sold on this basis, and laws controlling the business have been formulated upon it. The ingredients—nitrogen, phosphoric acid, and potash, with others—are necessary for the growth of all crops, but the amounts of the essential ingredients, other than the above-mentioned, are believed to be present in the soil in sufficient quantities to meet all the requirements of the crops grown.—*Samuel Fraser* (*"The Potato"*).

The Sow and Her Pigs.

A shallow nest is much the best, and many fine pigs, sometimes even whole litters, have been lost by giving the sow a too generous supply of bedding material. In warm weather, but little, if any, need be given and in cold weather, the nest should be thoroughly protected on the outside, and made so comfortable that a great pile of hay or straw will not be necessary to prevent the pigs from becoming chilled. About six or eight inches from the floor, and some distance from the sides of the pen, near the nest, a scantling rail, or pole, should be fastened: this will prevent the sow from crushing the little pigs between herself and the wall.—*F. D. Coburn* (*"Swine Husbandry"*).

The warm, clean, satisfied pig does not shriek so as to scare horses a mile away. Only the half-starved do that.

Farm and Garden Notes for December.

By GEO. CARTER, F.R.H.S.

"POVERTY BAY" RYE GRASS.

JUDGING from letters I have received I think that there must be a good deal of misconception regarding this grass, many farmers even thinking it something quite new. But after all this much-boomed grass is only an old friend Perennial Rye Grass (*Lolium perenne*) under a borrowed name, and reaching us here through an Australian source. It is the common Perennial Rye Grass grown and seeded in the Poverty Bay district of Australia, where the grass seems to do remarkably well. All sorts of ridiculous claims are made with reference to it, yet there is only one possible advantage which it can possess—that of an easier acclimatisation here, because the seed originates in a climate fairly similar to ours. I am not prepared to say that this claim is not justified, but it has yet to be proven in Natal. At the same time an experiment might be worth trying. Readers will remember that much the same claims have been made for certain Australian lucerne seeds, but the results of experiments here have not justified the payment of the much higher prices paid for the seed, as compared with the broad leaved "Provence."

Farmers in the mist belt should also bear in mind that Perennial Rye Grass has not been a great success in such districts, being very susceptible to the forage "rust"; and the Poverty Bay Rye Grass is also subject to the same attacks. As far as Natal is concerned, I think it has been proven that the Italian Rye Grass is much the better and more useful grass. Over the border—in other words, out of the mist belt—it is probable that the perennial variety will prove the better of the two, because of its more permanent nature.

DECEMBER CROPS.

The planting of mealies and the main crop of potatoes will be almost completed, and energies may now be directed to a few side crops. The serious long spell of drought during October and nearly half November will have delayed the sowing of grasses, and this work must be tackled.

CABBAGES.

Towards the end of the month the long-season Drumhead types of cabbage should be sown, including "Robinson's Drumhead" and "Drumhead Savoy." Most farmers are now drilling the seed in the field, with drills three feet apart, and using about two pounds of seed to the acre. But where labour is plentiful one-quarter of the seed will produce quite enough plants for an acre, in seed beds, to be transplanted to the field

when the weather is favourable. The right distance apart for the plants is three feet each way Varieties such as Enfield Market, which do not take more than four and a half months to mature, may be sown later.

Beans.

Another crop for present sowing are put into drills 2½ to 3 feet apart, the plants standing 4 to 6 inches apart in the drills for field work. About forty pounds will sow an acre. The choice of variety will depend largely upon the market to be catered for. "Canadian Wonder" is probably the heaviest cropper still. The small, roundish, "White Haricot" is the one most free from disease, and always commands a good market for table use, and the same may be said of the Dwarf White Kidney. The Common Red (originally imported as "Fulmer's Forcing," I think) is in good demand for Kafir trade, and a good and early variety. Other colours and kinds are somewhat of a drug on the market.

Swedes.

The first sowing of Swedes should be made in the middle of December in the colder districts. There is always the risk of "fly" taking off the first batch, and if this has been put in early enough there is yet time to re-sow without being tied down to Turnips. Sow three or four pounds to the acre, in drills eighteen to twenty-four inches apart, thining out later to, say, ten inches in the drills. I would like to see far more Swedes sown in the Midlands for winter farm use. The exhibits at Camperdown Show last July were ample proof that they will succeed in such districts, and all Midland farmers would find them a wonderful stand-by during the winter and early spring for many purposes. Sowing, here, would be a month later.

Mangels.

It is regrettable that those sown at the best time of all, October, have had such a bad time, and very few farmers have got a stand worth keeping. Seed sown now will not have necessary time for the fullest development, but still it is not too late yet to secure a good weight per acre.

Carrots.

"White Belgian" and "Long Red Altringham" should be sown this month. Sow three to four pounds of seed to the acre, in twenty-one inch drills. This seeding is a fairly heavy one, but one has to bear in mind that one hot day, on the seedlings just up, plays sad havoc with such a tender plant. Thin to six inches apart in February.

English Sorrel.

This herb (*Rume acetosa*) is becoming a very nasty weed in certain districts of the upper parts of the Colony. It is of English origin, and the seed has probably come over in some of the grasses. In England it is grown quite extensively in gardens, a bed lasting about four years.

The change from the cold English climate to our warmer one seems to have increased its vitality, and its "couch" nature renders its eradication a most difficult task. On some farms it has quite taken possession of whole fields, and make them quite useless for most crops.

I have been casting about for some means of fighting it, but with very little success so far. In certain parts of the United States it is eradicated in a couple of years by heavy dressings of lime, five tons of lime to the acre being used. But, dear me, one could buy double the area of land with the value of this lime here, and the cost of such treatment is absolutely prohibitive. Of the methods suggested there is not one which is at all practicable here, and we are thrown back on our own resources and experiment. I have suggested to some that a heavy smother crop, either Japanese Millet or Cow Peas, would probably much weaken the hold of the weed, and if persevered with would eventually choke it out, while in the meantime giving a crop of at least some value from the land. Say one put in at once a heavy seeding (100 lbs. per acre) of the running variety of Cow Peas. These would form an impenetrable mass under which no weed would grow, and would continue so until the end of March, when they would have to be reaped for hay and silage to save them from the frost After these are off, the ground should be immediately turned over, cleaned of the sorrel roots as far as possible, and immediately sown again thickly with rape. Sorrel develops wonderfully during our winter, hence the necessity for a winter smother crop as well as a summer one. If in the spring these two successive crops have not been successful in eradicating the weed, it might be necessary to continue the smothering process for a second summer. This is all theory I know, but I am quite certain that our only hope with this weed is *to smother it out.* A few months of bare fallow must be avoided until it has gone.

VEGETABLE GARDEN.

The Celery sown last month will soon be ready for transplanting. Trenches should be prepared a foot deep and three feet apart. The whole of the soil is thrown out of the trench on to the intervening ridge, and the bottom of the trench is then forked over. In the trench place six inches of rotten manure, well beaten down, and on the manure three inches of good soil. The young plants are then set in this soil, at about six inches apart, and well firmed down and watered. The balance of the soil which came out of the trench is left on the ridges, to be used later on for earthing up the Celery for blanching. In the meantime all the space between the trenches may be used for a crop of Beans or Lettuces, which will be used up long before the soil is wanted again for the purpose mentioned.

The first batch of Cauliflowers will also be fit to transplant, and if you have followed the hints of last month you will now have some well

spaced and vigorous seedlings, and a bit of good rich land ready to receive them. Transplant each one separately, with the trowel, breaking the soil as little as possible in the process, and firm in the plants well. Take no notice of the people who try to persuade you that the taproots should be broken to produce fibrous feeding roots. It is true that more fibrous surface roots are formed if the taproot is broken, but it is also true that the plants' "water pump" is gone, and that a source of food away down at the base is cut off. No one can persuade me that serious check in growth can be good for any plant.

The first sowing of Savoys (the Drumhead) should be made towards the end of the month. A successive lot of beans must be put in as usual. Let the strawberry runners go now, to form good young plants for next season's crop.

THE FLOWER GARDEN.

In speaking of the sowing of biennial and perennial flowers last month I omitted to mention one very important item, that is the Biennial Stocks. The "Brompton" and "Intermediate" types of Stocks are far hardier and more profuse bloomers than the "Ten-week" type. To bloom next spring, commencing about early August, the seed should be sown now, in shallow trays. The seed will germinate in a few days, and in a month will be ready for more room. Now, Stocks are not easy to transplant, being tap-rooted, and our usual method, for our own planting, is to first put them into two, or three, inch pots, and let them fill these with roots before we put them into the open garden. (All enthusiastic gardeners should have a few of these small pots about for use in this way, for many plants do much better for this double shift.) In choosing the plants for the permanent bed, put the dark green, long-leaved, vigorous ones on one side. They look by far the best, but are probably "singles." The rounder leaved plants, not so vigorous looking, somewhat more hairy, and with a tendency to curl in the leaf, are the good doubles. Choose these, therefore, for the final planting out.

There should be a few Dahlia bulbs still unplanted. If so get them in now to give you blooms when the spring planted batch is over. Cut down just a few of the most vigorous Chrysanthemums right to the ground. These will start away at once, and will throw a profusion of blooms three weeks to a month later than those which are left alone. Late Chrysanthemums are extremely valuable, as they come in at a time when flowers are getting scarce.

Sow a good batch of Marguerite Carnations, to bloom from the end of April until July, and see that you get the "Giant" type. Balsams, Swan River Daisy, Celosia, Coreopsis, Dianthus, Helichrysum, Phlox will bloom well before the winter if sown now. Next month we will talk about the methods of providing plenty of flowers for the winter months.

Exchange Reviews.

Steamed Bone Meal.

A recent issue of *Agricultural News* contains a useful article in which a few of the uses to which steamed bone meal can be employed are mentioned. It is stated that steamed bone meal is an excellent phosphatic manure, containing a high percentage of phosphate of lime (about 60 per cent.) and a small quantity of nitrogen (about 1·6 per cent.). The phosphate is, however, all in an insoluble condition, and—like most other manures—it must be used with due consideration of the land and the crops, if its effect is to be profitable. It is hardly to be recommended on heavy land, except for such permanent crops as grass or fruit trees. All manures decay slowly—and all insoluble manures work slowly—on heavy soils, so that the gradual effect produced by bone meal on these soils is frequently not appreciable to the ordinary cultivator. On sandy soils or light loams requiring phosphates, steamed bone meal works well, but an improvement in the crop is more often seen when a dressing of potash is also applied at the same time. Phosphates do not appear to be necessary for the sugar-cane crop, but frequently give good results with fruit trees.

Manuring with Superphosphate and the presence of Lime in the Soil.

The presence of a sufficient quantity of lime in a soil to which superphosphate is applied is an important factor, since upon this depends, to a large extent, the manner in which the superphosphate is available for the growing crop. Mr. A. D. Hall, F.R.S., Director of the Rothamsted Experiment Station, in his book "The Soil" remarks that in an ordinary soil containing a sufficiency of calcium carbonate, the application of soluble phosphoric acid, like superphosphate, will chiefly result in the precipitation of di-calcium or "reverted" phosphate, wherever the solution meets with a particle of calcium carbonate. This di-calcium phosphate is a compound easily soluble in weak organic acids, or in water containing carbonic acid: hence the great value of applications of superphosphate on soils rich in lime, for thus a readily available phosphate is very quickly disseminated throughout the ground in a state of fine division.

On soils poor in calcium carbonate, the precipitation will be chiefly effected by the hydrated iron and aluminum compounds, and the resulting phosphates are practically insoluble in water containing carbonic acid, and but little in saline solutions, or in weak organic acids.

Hence applications of superphosphate to such soils become much less available to the crop, and should be preceded by a thorough liming of the land. Even a subsequent liming on soils containing phosphates of iron or alumina will help to bring them into a more available form, because a double decomposition will take place, resulting in the production of calcium phosphate and hydrate of iron. This reaction will proceed to an extent dependent on the proportion of lime present in the medium.

Separated Milk for Cows.

In a paper read by Mr. Campbell, Assistant Secretary of Agriculture, Ireland, on "Store Cattle, or Butter, Eggs, and Bacon," at the fifteenth meeting of the Council of Agriculture, he directs the attention of all interested in the subject to a series of valuable experiments which have been carried on for the past two years at the Clonakilty Agricultural Station. The experiments extended over two years, and were repeated three times on three lots of pigs. Separated milk and potatoes were fed to one lot; separated milk, potatoes, and meal to another; while the third received meal and potatoes, but not milk. Two questions were submitted by the Department of Agriculture to their expert, Mr. Duncan:—(1) What is the value of separated milk when fed to pigs? and (2) to what price must pork fall to yield less than one penny per gallon? Mr. Duncan's answer to the first question is that when pork was selling at 48s. 3d. per cwt., separated milk, fed as above, yielded 2d. per gallon; and in answer to the second question he says that so long as pork was selling at 40s. 4d. per cwt., the separated milk returned 1d. The experiment further showed that pigs cannot be reared profitably without milk. Mr. Duncan is now engaged in estimating by direct experiment the value of separated milk when fed to calves. Fed to winter-bred well-bred calves it may yield as much as when fed to pigs, but whether it yields as much when fed to the ordinary spring calf is very doubtful.

Effects of Glass, Metals, etc., in Cheese Making.

An important factor with which the cheese maker has to deal is the irregularity in the coagulation of milk with rennet. This irregularity may be traced to a number of sources, such as variation in the strength of rennet extract used, the quality of the milk, and the kind of utensil employed. Experiments were conducted by Mr. G. A. Olsen, of the Wisconsin Agricultural Experiment Station to ascertain the effect of different metals as compared with grass on the length of the coagulation period.

The experiments were conducted by placing milk in contact with the various metals for definite periods of time and afterwards observing the time required for the coagulation of such milk, with a standard solution of rennet, under uniform conditions. It was found that with the single exception of aluminium each of the metals tried produced a retarding influence on the rennet action. The most striking influence observed was in the case of milk in contact with pure nickel. Milk which had stood in contact with this metal for twenty-five hours at 87 degs. F. required four hundred and twenty minutes for coagulation with rennet and showed an acidity of 0·167 per cent. Under the same conditions milk in contact with glass required only nienteen minutes for rennet coagulation and showed an acidity of 0·207 per cent. Copper also exerted a decidedly retarding effect. Apparently glass exerted a more or less accelerating influence on rennet coagulation and was to this extent beneficial in action. The degree of effect was directly dependent upon the character of the glass.

Trypan Blue for Biliary Fever.

In the *Cape Agricultural Journal* for October, Mr. Walter Jowett, F.R.C.V.S., of the Veterinary Branch of the Cape Department of Agriculture, discusses a method of treatment for canine piroplasmosis (biliary fever or malignant jaundice), recently discovered by Prof. Nuttall, of Cambridge University, and Dr. Hadwen, of the Canadian Department of Agriculture. These two investigators found that the administration of a dye known as Trypan blue, to dogs suffering from biliary fever, resulted in most instances in effecting a speedy cure. The results which are given of experiments made with the dye are instructive; they are as follows:—(*a*) Six dogs were infected experimentally with biliary fever (by injection of virulent blood), and subsequently treated with one injection of Trypan blue: all recovered. (*b*) Four dogs were injected in like manner, but did not receive drug treatment: all died. (*c*) One experimentally injected dog in which the treatment was attempted by the administration of a dose of Trypan blue *by the mouth,* also succumbed. (*d*) One dog injected experimentally and injected three days later subcutaneously with half doze of Trypan blue before parasites had appeared in its blood, remained well; as did also an animal which received a dose of Trypan blue and six days later an injection of virulent blood.

Trypan Blue for other Diseases.

Nuttall and Hadwen also, it is stated, tried one experiment with Trypan blue for East Coast Fever, but the drug exerted no curative action. Experiments are in progress, under (so it would appear) the

auspices of the Cape Department of Agriculture, with a view to ascertaining the curative action, if any, of Trypan blue on South African Redwater of cattle and Heartwater of sheep and goats. With regard to the former disease, Mr. Jowett remarks: "It is anticipated that the dye prove efficacious as a curative for this disease, as it seems to have done for the milder 'English' form of redwater (cattle)."

Lucerne, etc., for Horses.

A recent bulletin of the Utah Experiment Station contains the results of six tests which were made with lucerne hay in comparison with timothy for horses under varying conditions of work. It was found less difficult to maintain their weight with lucerne. The appearance of the horses in every comparison was in favour of those fed lucerne, and no ill results were noted on their health by long-continued lucerne feeding. Fourteen-hundred pound horses at hard work could be maintained in condition on 32·6 pounds of lucerne hay per day, and at rest 20 pounds was sufficient for the same horses. There is no doubt that the Americans feed their horses too much hay. It is common among farmers to allow the horses to stand to full mangers when not at work. But in London, the cab horses for example, are given hay for but two hours a day, in the evening. At the end of two hours the mangers are cleared.

Careful testing in decreasing the timothy hay ration one half has not shown that the horses required any more grain than before to keep them in equally good condition. Horses do not require a heavy ration of lucerne hay. Fed with grain, probably ten to fifteen pounds of it is equal to a manger full of other hay. As they become accustomed to the lucerne it may be increased a little, and the grain decreased. It is a rich food and should not be used as freely as hay with less protein.

Are there not some dark, damp corners in your cow shed where you can put in a window and let the life-giving sunshine and light get in?

Dry earth is one of the most useful adjuncts of the poultry house during the winter months. The dust bath furnishes both pleasure and health to the hen, both essential to large egg production. The wise poultry-keeper is on the outlook for opportunities to gather his supplies, as they can only be procured during the summer and autumn.

The Position of East Coast Fever.

THE Chief of the Veterinary Division (Mr. W. M. Power) furnishes the following list of outbreaks of East Coast Fever that have occurred during the period 21st October to 18th November:—

Dundee District.—Outbreaks on the farms "Klip Rots," east of main line, "Boschhoek," west of main line, and "Bonny," east of main line.

Weenen District.—Outbreaks on the farms "Hazelwood," and "Zwager's Hoek."

Umvoti District.—Outbreaks on the farms "Bracken," sub-division of "Rust," "Highbury," sub-division of "Hartebeestvlakte," "Newnham," sub-division of "Hartebeestvlakte," "Maresdal," sub-division of "Maresdal" and "Geluk," Cambridge Wattle Co., sub-division of "Welgewonder," "Mount Helen," sub-division of "Wonderboom," "Statin," Petrus Vlei," "Overloed," and "Baviaan Krans."

Alexandra Division.—Outbreaks on Crown Lands, adjoining Location No. 2.

Klip River District.—Outbreaks on the farms "Piet's Hoek," sub-division of "Reitfontein," east of main line, and "Blanerne," sub-division of "Roodepoort," west of main line.

Krantzkop District.—Outbreaks on the farms "Kopje Aleen," "Rugged Run," "Broeders Hoek," and "Elands Kop."

Lion's River.—Outbreaks on the farms "Ettrick," sub-division of "Boschhoek," east of main line, "Amberley," sub-division of "Roode Spruit,' east of main line, and "Klipfontein," sub-division of "Gelhoutboom," east of main line.

New Hanover.—Outbreaks on the farms "Elands Spruit," "Hopewell," sub-division of "Spitzkop," "Mooi Plaats," and "Kromdraai."

Camperdown District.—Outbreaks on the farms "Hammasdale," "Pinmore," "Eeling Lassie," and Denby's Estate, sub-division of "Leeuw Poort."

Estcourt District.—Outbreaks on the farms "Craig," west of main line, "Wildcroft," shown on map as "Tempe," west of the main line, and "Excelsior," sub-division of "Boschhoek," west of main line.

Umgeni District.—Outbreaks on the farm "Short's Retreat," "Springfield," sub-division of "Ockerts Kraal," "Dalmerny," sub-division of "Slang Spruit," "Lilliefontein," "Albert Falls," Lot A of "Uitolught," and among H. Pathon's cattle at Albert Falls.

Newcastle District.—Outbreak on the farm "High Vale," west of main line.

No record is kept of outbreaks in the following Magisterial Divisions:—The whole of the Province of Zululand, the whole of Victoria County, Umsinga, Vryheid, Ngotshe, Babanango and Paulpietersburg.

Among the Farmers.

THE ASSOCIATIONS DURING THE MONTH.

*** *The attention of secretaries of agricultural societies and similar bodies is drawn to this section of the* Journal, *which has for its object the publication of reports of farmers' meetings, annual reports, presidential addresses, etc.; and it is hoped that full use will be made of the facilities here offered for the dissemination of news regarding such doings of the many associations all over the Colony as are likely to prove of general interest to readers of the* Journal. *In forwarding copies of presidents' reports, etc., correspondents are respectfully requested to make sure that they give the date of the meeting on the occasion of which the address was delivered or report read.*

DUNDEE.

THE eighth annual meeting of the Dundee Agricultural Society was held on the 6th October. There was not a very good attendance when the meeting commenced, but late arrivals swelled the number to quite respectable dimensions for a Dundee meeting. The minutes of the previous annual meeting having been disposed of the President, T. P. Smith, presented his annual report as follows:—

"Gentlemen,—I have pleasure in presenting to you the eighth annual report of the working of your Society.

"During the year a great deal of time at the meetings have been taken up with the subject of the much dreaded East Coast Fever. It is with regret that we see this disease still spreading to an alarming extent, not only in our district but throughout the Colony. In the interests of our community it was found necessary by our Society to appoint Mr. J. Dyson and myself as delegates to attend a meeting of the Sub-District Advisory Board, to impress upon the members the urgent importance of enforcing the stamping out system in Sub-District "B." By the invitation of the Board I accompanied a delegation to Pietermaritzburg to interview the Minister of Agriculture upon the matter. The result of that delegation proved satisfactory and we achieved our object. In my opinion we have yet to face a much graver state of affairs unless the Government decides upon a firmer line of action.

"Next in importance comes the Annual Show, which we held on the 11th and 12th of June. I am pleased to report that the Show was a record one, not only in number of entries but in attendance, and general satisfaction was given both to exhibitors and visitors. The success of the Show was largely due to the excellent prize list provided by the Society,

and which made a good impression upon the public. Since our last Show, in 1908, several important improvements have been made. A railway siding now runs through the grounds and a small platform has been erected in a most central and convenient position, which proved a great boon to exhibitors at this year's Show. Permanent sheep pens have also been erected at considerable cost to the Society, as well as fifty dog benches. The Produce Hall floor has been levelled up and the Horse Ring was put in first-class order.

"I would crave your indulgence for a short time in touching upon the several sections of the Show.

"*Horses.*—The exhibits in this section were numerous and the quality quite equal to the fine display made in this section last year; the sporting competitions brought forth a large number of entries and created very great interest. Suggestions for the further improvements in this section will be laid before you during the incoming year.

"*Cattle.*—It is unnecessary for me to state why there were no exhibits in this section.

"*Sheep.*—The quality was the best seen at a Dundee Show, but the number of the exhibits was a little disappointing in view of the fact that the Society had expended so much upon substantial pens. Merinos, fine-woolled and robust-woolled types, were the principal classes filled, and I am of the opinion that a number of the exhibits in these classes would have taken honours at any show of sheep in this Colony, if not anywhere in South Africa. The Persian and bastard classes were not so well filled as we had a right to expect; those exhibited, however, were of good quality. These animals being now numerous and well suited to our immediate locality it is hoped that breeders will come forward next year and creditably fill the classes provided for them.

"*Goats.*—The classes for Angoras were poorly filled; only one exhibitor brought forward entries of first-class animals. The milch goat classes were fairly well filled with exhibits of more than ordinary quality.

"*Pigs.*—These were disappointing in numbers. No doubt this is accounted for by the difficulty of transport. It is earnestly hoped that this section will be better patronised at our next Show. I am convinced that we have not yet realised the importance of this industry.

"*Produce.*—In spite of the unfavourable season we had the exhibition was generally of good quality, and the entries, although not as numerous as we wished for, were fairly satisfactory.

"*Manufactures.*—This section was well filled and the quality very good. The pie fruits and preserves were particularly good. The thanks of the Society are due to the ladies who were responsible for bringing forward most of the entries in this section.

"*Poultry.*—The display in this section was very creditable. The entries were numerous and the quality the very best. The Poultry Club

is to be congratulated upon the strides which have been made. It was admitted by gentlemen best able to judge that the Dundee Poultry Show was the best country display yet seen in Natal. The Poultry Committee will present a separate report, therefore it is unnecessary for me to say more.

"*Dogs.*—Early in the year a Kennel Club was formed under the auspices of the Society and was duly affiliated to the South African Kennel Club. The first display under the new conditions took place at our Show, and, judging by the exhibits, the Club has received every encouragement to go ahead. The Society is expecting much from this section in the future.

Implements and Agricultural Machinery.—A very fine collection of these was to be seen at our last Show. One exhibitor especially showed a collection such as never before seen at a country show in this Colony.

"I would like to take this opportunity of recording the Society's great appreciation of the kindness of those gentlemen who so liberally presented special prizes.

"The matter of obtaining judges is becoming more difficult every year. It is with great satisfaction that the Society learns that the Agricultural Union is taking up the subject of forming a Judges' Association. Until this is done we shall always experience difficulty in obtaining judges who will satisfy the general public. It is the intention of the Society to encourage the formation of the proposed Association.

"Our members now number ninety-two. This is not as it should be; we must endeavour to enlist the active interest of all the members of the community. Every existing member should be a canvasser for the Society. Gentlemen, I earnestly commend this matter to your attention.

"Another matter which should receive immediate attention is a working plan of our Showyard. This should be drawn up and all work done in future should be according to the plan.

"At a meeting held in June the Society authorised Mr. H. Ryley to buy for it a suitable building at the Military sale then about to be held at Standerton. He was given up to £150 as a limit to which he might go. I am pleased to say that Mr. Ryley was successful in purchasing a wood and iron building, 27 x 87 feet in dimensions, which will cost us, when erected here, approximately £100. The building is now in course of construction, and the Society's best thanks are due to Mr. Ryley for his services.

Meetings.

"During the year there have been five committee and six general meetings held. I regret to say that the average attendance was very poor. Gentlemen, the vitality of your Society depends on the unanimous active support of its members; if you allow the vitality to remain low the inevitable result will be general decay. I trust that you will see to this matter during the incoming year.

"Mr. A. W. Smallie attended the annual meeting of the Agricultural Union as your delegate; his very able report of what took place can be seen on application to the Secretary.

"Your thanks are due to the Mayor and Corporation of Dundee for the use of the Chamber during the year, also to your Secretary for the energetic and able manner in which he has conducted the business of the Society.

"I wish to thank you again for the honour you did me in electing me your President last year, and I trust that you will give my successor the same support and good will which you have accorded to me."

Mr. Smallie proposed the adoption of the report, with thanks to the President for his good work during the year. Mr. Tandy seconded and the report was unanimously adopted.

SECRETARY'S REPORT.

In presenting the balance sheet for the year 1908-1909, the Secretary, Mr. J. McKenzie, remarked that the credit balance, profit and loss account, amounted to £216 6s. 3d., an increase of £34 12s. over last year. The amount received in subscriptions was £98 14s., compared to £101 17s. last year. Taking into consideration the fact that Poultry and Kennel Clubs had been established this membership could not be regarded as satisfactory. A sum of £174 10s. 9d. was expended during the year on permanent improvements. The entrance fees for the Show were £26 6s. in advance of those for last year, and the gate brought in £102 10s., as against £96 the previous year. In 1908 the special prizes amounted to £114 4s. 6d., and the prize money paid out totalled £223 2s. 2d., the corresponding figures for the present year being £229 16s. and £316 16s. 3d. So far special prizes to the amount of £202 are promised for the next Show. The Secretary concluded his remarks by expressing a hope that entrance fees would in future be sent along with the forms, as it would facilitate the work and obviate much bookkeeping.

On the proposition of Mr. Walker, seconded by Mr. Springorum, the Secretary's report and balance sheet were adopted, the latter being subject to audit.

The Poultry Committee's report was next presented as follows:—

REPORT OF POULTRY CLUB COMMITTEE.

"We have nothing to report beyond the Annual Show and matters arising therefrom. Dealing with the Show first, your committee has great satisfaction in stating that the entries in our section were double those of last year, making in fact a third of the entries on the whole Show. We are pleased to say that the exhibitors were well satisfied with all the arrangements with the single exception of the housing of the dogs under the same roof as the poultry. Not only exhibitors but the public in general found fault with this arrangement and many were, on account

of it, prevented from enjoying the grandest show of poultry ever held outside the two large towns, in Natal. It has come to our knowledge that many large poultry fanciers have been favourably impressed, and if sufficient inducements are held out next year we can rely on our entries being greatly increased.

"Touching upon the exhibits, we have to remark that the most popular breeds appeared to be the Leghorns and the Wyandottes, with Plymouth Rocks running them very close. There were strong classes in many other breeds, and as an exhibition of poultry the section was a very representative one. As regards the cage birds and pigeons, little inducement was offered to exhibitors, but your committee hope to be in the position to bestow more attention on this interesting section at future shows.

"The judging was done by Mr. W. Dixon, assisted in a few classes by Mr. H. H. Jones Ikin, and these gentlemen, we are pleased to say, gave general satisfaction. We experienced great difficulty in obtaining judges, but as there is a movement on foot to form a Judges' Association in South Africa we hope that this difficulty will be overcome in the near future. For this and several other reasons we strongly recommend that the Society become affiliated with the South African Poultry Association.

"As to the prizes, your committee begs to report that the cup offered by the Society for the most points in poultry classes was this year won by the Social Farm with 211 points. This cup, together with the special prizes, which amounted to £22 11s. 6d., were a great attraction to exhibitors, and we are of the opinion that more money spent in this direction, especially in floating trophies, would be money well invested. The Society allowed the Club £30 for ordinary prizes, and we are pleased to state that only £24 of this amount was expended.

"Your committee has under consideration the need for slight increases in the entrance fees at next year's Show and the awarding of prizes in proportion to the amounts received as entrance fees, this being without prejudice to the degree of certificate awarded.

"We are pleased to learn that the Society has procured a suitable building for the poultry section; this will prove a further attraction to owners of valuable poultry. The number of pens at present owned by the Society is quite inadequate for our requirements, and we should be glad, if finances will permit, to have at least 300 more.

"Your committee recommend that in order to meet fanciers, an associate membership be instituted in so far as the Poultry Club is concerned, and that the fee for associate membership be fixed at 10s. 6d. per annum, this to entitle fanciers, *at shows only*, to all the privileges of full members. We further recommend that the President and Secretary of the Society be *ex-officio* members of the Poultry Club Committee, and

that a secretary be appointed to deal solely with matters affecting the Club."

Mr. Ryley proposed the adoption of this repo t. This was duly seconded by Mr. Smallie and passed unanimously.

KENNEL CLUB COMMITTEE.

CHAIRMAN'S REPORT.

"It is with pleasure I have to report that the above Club was formed in November last year, and in February we became affiliated with the South African Kennel Club.

"Our first Show was held on the 11th and 12th of June, when we had a total number of entries of 128, which, taking everything into consideration, was most satisfactory for the first year.

"We found ourselves somewhat hampered for room at the Show, and we felt it was a mistake for the poultry to be alongside the dogs, as the dog fanciers strongly objected to the noise caused by the poultry.

"From the financial statement which is placed before you you will observe that our receipts exceed our expenditure by 12s. The benching cost the Society £28 9s., and this can be regarded as an asset.

"It is the intention of the Club to apply for a three-point championship. In the event of being successful we anticipate that the entries next year will be increased at least threefold and it will be necessary to provide a great many more benches.

"The membership, I am sorry to say, has not reached the Club's expectations, but I am confident that this will improve as we make advancement.

"The adoption of this report was proposed by Mr. Walker, seconded by Mr. Norman, and passed

All the above reports having been duly received, Mr. Smith announced that the next business was the election of officers for the ensuing year. He then vacated the chair, and the Hon. C. G. Wilson took charge of the meeting."

The result of the elections is as follows:—

President: Mr. T. P. Smith, re-elected.

Vice-Presidents (in addition to those who are *ex-officio*): Messrs. H. Ryley, A. W. Smallie, and F. Turton.

Secretary and Treasurer: Mr. J. McKenzie, re-elected.

General Committee: Messrs. G. M de Waal, B. J. Humann, H. J. Walker, W. J. H. Muller, H. J. Head, C. T. Vermaak, J. Campbell, H. Greenhough, D. W. H. Tandy, T. J. Williams, A. L. Jansen, W. Springorum, R. Doidge, H. W. Walwyn, A. E. Norman, and D. M. Meaumann.

A hearty vote of thanks was accorded to the Secretary for his past services and the usual honorarium was voted.

Mr. T. P. Smith proposed that, in recognition of the long and valuable services rendered by Mr. Ryley, he should be made a life member. This was seconded by Mr. Turton and passed unanimously.

The following were elected members of the Poultry Club Committee: Messrs. H. Greenhough, W. R. Hesom, G. Buchanan, R. Doidge, A. E. Norman, and H. W. Walwyn, the last named to act as Secretary.

The following constitute the Kennel Club Committee:—Messrs. T. J. Williams, D. R. Cresswell, T. Fruin, H. P. Walker, and T. Longmoor, who will elect a Secretary from their number.

It was resolved that the President and the General Secretary of the Society should be *ex-officio* members of both the above committees.

The Poultry Committee having recommended that an associate membership be instituted for the benefit of fanciers outside this district, the question was now discussed, and, after some opposition, it was decided to accept the recommendation. This will allow members of other poultry clubs to become members as far as concerns the Show on payment of half the usual subscription—10s. 6d. instead of 21s.

A further recommendation of the Poultry Club Committee, *viz.*, that the Club affiliate with the South African Poultry Association, was discussed and accepted by the Society, with the proviso that the fee should not be more than two guineas; if more the matter of affiliation to be dropped.

The President pointed out that the Societies in other small townships canvassed the two large towns for special prizes. He considered that Dundee had every right to expect support from the merchants of the two large towns, as much as others had at any rate, and he proposed that the Secretary be authorised to canvass Durban and Maritzburg at some time convenient to himself.

The Secretary now read a letter from the *Natal Witness* in which the editor of that paper introduced Professor Carl Otto and asked the Society to support him in connection with experiments he was making with East Coast Fever. The farm Dumain had been placed at the disposal of the Professor for the purposes of the experiment by Mr. Meumann, and it was felt by the majority present that he should have a chance given him to prove the value or otherwise of his theory (which has been described in the *Natal Witness*). After a long discussion, it was however decided that the Society would have nothing to do with the experiment as a Society; a meeting of those interested would be held in the afternoon.

The next business was a letter in connection with tree-planting from Mr. Smallie, but as the meeting had already been a very long one an adjournment for a fortnight was proposed and passed. The meeting thereupon came to an end, the 20th inst. being fixed for the adjourned meeting.

ALFRED.

The annual general meeting of the Alfred County Farmers' Association and Agricultural Society was held at Harding on the 23rd October. Mr. A. G. Prentice, J.P., the President, presided.

The President read his annual report, which contained, *inter alia*, the following:—

"Gentlemen,—I deeply regret that owing to the spread of East Coast Fever and the consequent stoppage of all movement of cattle, your committee found it imperative to abandon the holding of a show in June last, but I trust that every endeavour will be made to hold one next year, as it is fatal to any Association to abandon the holding of a show for any length of time.

"I am pleased to tell that the overdraft at the Bank, necessitated by the building of the Product Hall, has been cleared off, and this is chiefly due to the efforts of the ladies of the district who kindly held a bazaar, which resulted in the taking of over £50, for this purpose. There only remains the Debenture Bonds to clear off. Several members have generously returned their debentures as a donation, and I earnestly appeal to others to do likewise.

"You will remember that during the last Session of Parliament the Government introduced a Bill for the building of a section of the Alfred County line to the Paddocks on the Murchison Flats, and that this Bill was practically thrown out.

"In April last, I invited Mr. Claude Manning, the President of the Lower Umzimkulu Progressive Association, who was working in this matter, to attend a public meeting here, with the result that a deputation, comprising delegates from both divisions waited upon the Government and received a promise to re-introduce the Bill the next Session. This promise has been kept, and the Bill has now passed both Houses of Parliament.

"I know that you are bitterly disappointed that the line was not passed as a whole, or that the first section was not at least to the Izingolweni, so that it would tap this Division, but your committee has done everything possible to this end.

"I am afraid that the outlook for us as a farming community is anything but a rosy one. We are surrounded on three sides by closed borders. The Cape Colony, once friendly, is now, owing to East Coast Fever, hostile to us, and owing to the prohibitive rates charged for mule transport down to Port Shepstone, our mealies remain in the crates unshelled, and our wattle plantations uncut; in fact everything we produce except wool is at present unsaleable owing to the want of railway communication.

"I wish to thank the committee for their assistance, and also the Hon. Secretary for the able way in which he has carried out his duties."

The Hon. Secretary and Treasurer (Mr. H. C. Hitchins) read his annual report, which was adopted. The Treasurer's statement showed that the Association had a balance in hand of £4 10s.

The election of officers for the ensuing year resulted as follows:—

President: A. G. Prentice (re-elected for the eighth time); Vice-Presidents: Charles Knok, J.P., C. A. Holwell, C. F. Rethman; Committee, C. M. Etheridge, Rev. S. Aitchison, J.P., H. S. Morgan, Dr. W. Case, J.P., W. B. Rethman, H. F. Rethman, Edmund J. Gray and R. G. Mack; Hon. Secretary and Treasurer: H. C. Hitchins.

DRONK VLEI.

A meeting of this Association was held at Creighton on the 30th ult. It is a matter of regret to the executive, and to those members who attend regularly and endeavour to promote the welfare of the district, that the attendance at these meetings is generally somewhat meagre.

Besides other items of importance, the meeting was called to consider the offer by Government of a piece of land adjoining, and to the west of, the railway station, for the purpose of erecting thereon an agricultural hall, etc. Having adjourned and viewed this site, the meeting decided that, as a much better site could be obtained by slightly altering the boundaries proposed, Government be asked to accede to the wishes of the Association. The ground in question is unoccupied, being part of the Town Reserve, and the allotment of the proposed portion to the Association would leave ample room for roadway, outspan, etc.

East Cast Fever was, of course, an inevitable topic, but the discussion was this time limited to the matter of compulsory fencing, Mr. Marriott maintaining, as he has always done, that the time to fence is *before* the disease makes its appearance in a district. It was stated that, while farmers in other parts of the Division had been liberally dealt with in this respect, it had been found almost impossible to obtain assistance in this neighbourhood. A strongly-worded resolution drawing attention to this was ordered to be sent to the Ixopo Advisory Board.

After some minor matters had been dealt with the meeting closed.

CAMPERDOWN.

At the annual meeting of the Camperdown Agricultural Society, the President (John Moon, Esq., J.P.), delivered the following address:—

The following was the President's report:—

"It affords me great pleasure in submitting this my annual report, and in doing so I would like to make a few remarks. This is our fifth annual meeting. We held our Show on July 23rd, 1909, and it proved to be a great success. We had about 800 entries, and I must say every entry was up to show standard. The classes for ladies were very well

entered for. The produce shown was more than a credit to the Colony, and would be hard to beat at any show held in South Africa. The horses were very good, both in numbers and quality. The Society's thanks are due to all exhibitors, and also to those who kindly gave prizes. Our best thanks are also due to those who took so keen an interest in the Society, as such an institution cannot be kept afloat without the interest and co-operation of all concerned. I hope the young men in this district will come forward and take an interest in the Society and all matters connected with agriculture. Our annual dinner was held on the night of the Show, and I am pleased to say was most thoroughly enjoyed by all those present. Almost everyone who attended the dinner offered to contribute a prize for next year's show, these contributions amounting to £80. The Cato Estates have promised the sum of £10 a year towards the funds of the Society, and I hope the Vanderplank Estates will do the same. Our very best thanks are due to the Catos for their donation. Generally speaking, the crops in the district have been good, and prices not much to complain about. I am extremely sorry to say that Tick Fever has got much nearer, and has already taken away cattle belonging to some of our members. I am afraid before long that there will not be many cattle left in the district and in the Colony in general, unless Professor Otto or someone else finds a cure for this dreadful disease. I think the thanks of every farmer in the Colony are due to the *Natal Witness* for the interest it has taken in assisting Professor Otto, and I am rather more pleased than otherwise to find the Government has not contributed any funds towards Mr. Otto's test. Let us be men and what we profess to be—'farmers.' If there is the slightest prospect of a cure being found, let us do it ourselves, and not run to the Government for every little thing. Townspeople have been crying out for years 'Farmers' Government' and 'all the money that is spent is spent on the farmers.' I must say that the Agricultural Department has been a big spending power, and all the money spent has been of very little avail, if any at all. Farmers and agricultural unions have held meetings throughout the year, but owing to the fact that none of these meetings have hard and fast rules laid down, there always seems to be a difference of opinion. All that has been done has proved to be a failure, and to-day we do not seem to be any nearer a cure or preventive for East Coast Fever, or in any way stopping the spread of this dreadful disease. My opinion is the same as it was when I read my report about two years ago, namely that the only chance of preventing the spread of the disease is by stamping out cattle on the spot. Let us all hope that something may be done, and that in the near future, to save the cattle that are left. In conclusion, I would like to convey my best thanks to the Secretaries of the Society (Messrs. Walker and Burchell) for the able way they have carried out their duties. They have worked well for the Society, and have kept everything up to

the standard. I would like also to thank the judges and stewards for the way in which they assisted at the Show, and I hope every member will come forward and assist the Society to the best of his ability. As I have told you before, there is nothing to prevent Camperdown becoming the best produce show in the Colony.

Correspondence.

BOW YOKES.

TO THE EDITOR OF THE "AGRICULTURAL JOURNAL."

SIR,—Will some of your readers supply us with a copy of a clip for the bow ox yokes as we have had some made from the sketches you gave some little time ago in the *Journal*, but we do not seem to have got the clip right.—Yours, etc.,

LEARNER.

MAIZE EXPORT.

TO THE EDITOR OF THE "AGRICULTURAL JOURNAL."

SIR,—Can you or any of your readers answer a question that I have already vainly asked in the daily press? It is this: We have a Government official to grade our mealies sent forward for export, but, as far as the grower knows, all that he does is either to pass them as fit for export, or to reject them. My idea of a "grader" is "one who grades," or assigns each parcel of goods to its proper class. One would then suppose that it would be a case of so many grades so many prices, but the fact is that all mealies seem to be sold at the same price here, as long as they pass the grader. Is that so, and if so, why?

One other: Cannot you, Sir, or the daily press, publish frequent and full details of quotations on the Home mealie market? This is done in the case of many other commodities.—Yours, etc.,

PLOUGHMAN.

[The Official Grader grades the mealies as he finds them. If the grain is choice quality he certifies accordingly and issues the certificate to the shipper immediately the maize is shipped. Choice grain should, of course, fetch a better price than fair average quality, but that is a matter entirely between the farmer and his buyer; and the Grading Officer is in no way concerned. In reply to the concluding paragraph of "Ploughman's" letter, we would refer our correspondent to the "Markets and Crops" supplement of the *Journal*, which every month contains the fullest information available regarding the oversea maize market.—ED.]

SOUTH AFRICAN WOODS FOR RAILWAY COACHES.

TO THE EDITOR OF THE "AGRICULTURAL JOURNAL."

SIR,—We are still desirous of obtaining woods grown in South Africa for the interior work of railway coaches.

Anybody interested in the supply of South African woods suitable for cabinet work is invited to communicate with the undersigned stating:

(*a*) Where the wood is grown.

(*b*) The names of the woods offered (state, if possible, both the botanical and South African names).

(*c*) The approximate quantity of each kind available.

(*d*) The average sizes in which the woods can be supplied (state approximate length, breadth and width of planks).

(*e*) When the woods would be available for delivery.

(*f*) The price per cubic foot free on rail any station in South Africa to be named by the supplier.

If suitable woods can be obtained we would make a trial of them in two State Coaches de Luxe, and we would require for this purpose light coloured woods of fine attractive figure for panels and darker woods for framings. About 400 cubic feet would be required for the two coaches, but if the experiment is successful greater quantities of the suitable woods would be required.

Any South African grown woods may be submitted and will be carefully considered.

It is essential that any supplies offered must be good, sound, mature timber felled in the proper season when the sap is not in circulation and well seasoned when delivered.

We would accept delivery free on rail at any station in South Africa in logs or planks.

All supplies would have to be subject to the approval of the Chief Mechanical Engineer, Pretoria, who would be guided by a sample log or plank to be furnished by the supplier.

A representative sample of each wool must be sent to The Chief Railway Storekeeper, Germiston Station, Transvaal.

Communications on this subject should reach me at the earliest possible date, and not later than the 10th December, 1909.—Yours, etc.,

GEO. BOWDEN,
Chief Railway Storekeeper.

Durban.

THE FARMER BOYS' PAGES.

MONTHLY ARTICLES, NOTES AND PARAGRAPHS ON ELEMENTARY AGRICULTURAL SUBJECTS

FOR

BEGINNERS IN AGRICULTURE AND STUDENTS GENERALLY.

Conducted by "Arator."

*** *Correspondence, whether in the form of notes, comments, or inquiries, is invited from readers, and letters of general interest will be published and replied to in these pages. All communications should be addressed to* "Arator," C.o. Editor, "Natal Agricultural Journal," Maritzburg.

Implements of the Farm.

IV.—ROLLERS, SEEDERS, AND PLANTERS.

For breaking up quickly hard clods left by the plough, what is known as a roller is used. It is also useful for smoothing and compressing the surface of the soil. In principle they consist of a number of circular sections of heavy metal, held together on a spindle—on the same plan, in fact, as the ordinary lawn roller. They are made in different sizes, varying from 13 to 26 inches in diameter, and from 6 to 8 feet wide. In some forms they have smooth surfaces; in others the surfaces are fluted (in the latter case, they usually consist of a number of metal discs placed loosely upon a round axle). Whatever be the type of the roller, it is essential that it should consist of at least two sections, in order to offer less resistance in turning and to avoid tearing up part of the ground, which might easily happen were the roller to be made in one piece. By constructing it in sections, each of these is able, in turning, to move upon its own axis, some rolling forward while others roll backward. Obviously, the more sections the roller consists of the better.

The subject of rollers need not detain us further, since I think the construction and use of the implement will be readily understood from what I have said. We may accordingly pass on to the next, and an important, part of our subject: Drills and Planting Machines.

Drills are machines used for sowing seed. The old-time method of sowing grain was the broadcast method (which for some crops is still used to some extent), but it has been found that seed sown in drills yield a much better crop, and consequently machines for the purpose are employed even with such crops as oats, wheat, barley and other small cereals which used universally to be sown broadcast. Mealies, too, used to be planted by hand—although as a rule in drills or lines, except for forage purposes, when they are still sown broadcast,—but of late years mealie planters have come into use in South Africa, particularly in Natal, where they are very widely employed.

"A good drill," says a writer, "should sow uniformly the same quantity of seed, whether travelling on level ground, along the side of a hill, or up and down hill. It should adapt itself not only to all kinds of seeds, but to all conditions of seeds. The regulation of the quantity to be sown per acre, the shape of the coulters, and the steerage of the machine, are all matters of importance, but even sowing is the most important of all."

The principle upon which all drills are constructed is somewhat as follows:—A hopper holds the seed, which is usually mechanically agitated over one or more holes (according to the number of rows which the drill is designed to plant simultaneously), and is carried on two wheels, from which the mechanical action required for agitating the seed is derived. There is also, inside the hopper and just over the holes, a contrivance for the purpose of regulating the quantity of seed to be dropped. Passing through the hole in the hopper, the seed runs down a tube immediately behind a coulter which, as the machine is drawn over the land, opens a tiny furrow in the soil, into which the seed falls. The depth of this furrow can be regulated at will within certain limits by raising or lowering the coulter. To each hole in the hopper there is, of course, a separate tube and coulter. In some drills a rake or else a concave wheel follows immediately behind each coulter, covering up the seed as it falls into the furrow. In other makes, the coulter is so constructed that no covering device is necessary, the earth tending to fall automatically over the seed In the mealie planter covering is usually effected by the main driving wheels.

With most drills the distance of the rows from each other can be varied at will. In the case of the mealie planter, both single and double machines are obtainable, the use of which enables the farmer to set his mealies in rows of whatever distance apart he pleases.

Drills can also be obtained which will drill in the manure required as well as the seed. The manure hopper is situated behind the seed box, and the manure runs through a tube into the furrow immediately in rear of the seed. Many of the American mealie planters have an automatic manuring device that works in this way, and the bone dust

or other fertiliser required for the crop can be sown at the time of planting, thus saving a lot of time and labour.

Some of the turnip drills on the market have provision for ridging. A large concave roller runs *in front* of the coulter, and this ridges the surface of the soil before the seed is sown, while the covering and firming down of the seed are effected by means of a flat roller following immediately behind the coulter.

Some farmers prefer, for various reasons, to sow their seed in plough furrows—for instance, in very light land, in order to give the plants a firm seed-bed. To meet the requirements in such cases, a sowing attachment can be obtained, for use with the plough. It is simply hooked on to an ordinary plough, and is equally suitable for a double or multiple furrow as for a single furrow plough. For some crops, of course, it is only necessary to plant in every second furrow. A drill for sowing mealies can be had for use in the same way. The seed is thus sown at the time of ploughing the land, and the ground is afterwards harrowed in the ordinary way, which covers the seed. This method of sowing, of course, effects a considerable saving in labour and time.

Machines are also obtainable for planting potatoes. There are two kinds manufactured—those constructed on the "cup" principle and those made on the "needle" principle. In the former case the potatoes or "sets" are elevated, one by one, from the hopper, by means of cups fixed to an endless chain, or a drum. They are then tipped over into a spout, down which they are discharged into the furrows. In the machines working on the "needle" principle, the potatoes are picked up, in the hopper, by a number of steel needles which are affixed to a revolving disc. The "cup" principle of machine appears to work the more satisfactorily.

Where broadcasting corn is preferred to drilling, and for sowing grass seed, distributors can be obtained, which save much time as compared with hand sowing and at the same time ensure a more even distribution of the seed. These distributors are made either for hand labour (on the wheelbarrow principle) or for animal power. The latter, being much larger, do the work much more elaborately: a 10-ft. machine will sow 25 acres a day, while 30 acres a day can be dealt with with a machine two feet longer. These machines are manufactured on different principles. In some cases the seed is agitated by means of a brush spindle running through the whole length of the hopper, and is so run through perforated copper discs and delivered evenly over the ground. The "brush" principle has, however, to some extent been displaced by the "cup" and "disc" machines. In the "cup" machines the seed is delivered by means of cups fixed to revolving discs, into tubes, through which it passes on to the apices of triangular blocks on a dis-

tributing board. These divide it, and it finally falls upon rows of pegs below, which cause it to fall evenly to the ground. The "disc" machines work on somewhat the same principle as the brush machines, with the difference that, instead of a long, continuous brush, "waved" discs are fixed on to the spindle, one over each delivery hole. These discs in their revolution wave the seed from side to side over the whole, so that, with each revolution, four deliveries of seed are made into the holes beneath; and the holes themselves can be altered in size in accordance with the quantity of seed it is desired to sow.

Agricultural Chemistry for Beginners.

By ARCHIBALD PEARCE.

CHAPTER III.

NITROGEN AND AMMONIA.

NITROGEN is an element of the highest agricultural importance. It is another gas, of which four-fifths of the air by measure consist. By nature it is exceedingly inactive, and does not readily combine with other elements, and this is the reason why, although so abundant in the atmosphere, various nitrogenous manures have often to be applied to the soil; for all plants must have nitrogen for their growth, and only a few have the power of obtaining it from the air. In the air it acts as a check on the active and vogorous oxygen, diluting it, as it were, and preventing the too violent actions that would otherwise take place. The nitrogen that plants need is never absorbed into their tissues in its elementary form, but always in the shape of its compounds; accordingly nothing further will be said about it, but we shall proceed at once to its compounds, of which the chief are ammonia and nitric acid.

AMMONIA AND ALKALIES.

Ammonia introduces us to the class of compounds called *alkalies*, which are exactly opposite in their qualities to acids. They have a kind of soapy taste, and if applied to litmus paper that has been reddened by an acid they restore its blue colour again. Litmus paper is thus very useful as a test; an acid substance reddens it, an alkaline substance turns the colour back to blue, and if no effect is produced on either the red or blue paper the substance is said to be neutral. The alkalies act as bases, inasmuch as if mixed with acids they produce salts. The best known, besides ammonia, are caustic potash, caustic soda, and the alkaline earth lime.

Ammonia is a compound of nitrogen and hydrogen, in the proportion of 14 parts by weight of nitrogen to 3 of hydrogen. It is in reality a gas, but is very soluble in water, and this solution is the liquid commonly sold as ammonia. It is in almost all cases the product of the decomposition of animal or vegetable substances containing nitrogen. If a tuft of hair, or a few feathers, or a piece of horn be heated in a thin closed glass tube over a flame, we shall observe a few drops of a more or less evil-smelling liquid produced, and if we test this with red litmus paper, the presence of ammonia will be shown by the change of colour to blue. If a rotting manure-heap is allowed to get too dry, we can often smell the escaping ammonia, or show its presence by laying a piece of red litmus paper on the top, proving that the valuable nitrogen is being wasted. Any chemist will supply a little red or blue litmus paper for a few pence. The chief commercial source of ammonia is the gas-works, where illuminating gas is distilled from coal, which contains a small proportion of nitrogen; the ammonia is dissolved by the water in which the gas is washed, and the various ammonia products are manufactured from the solution.

Ammonia is generally believed not to be easily, if at all, assimilated as such by growing plants; it must first be converted into nitrates, as will be described in the next chapter. Most soils have the power of absorbing and holding ammonia, and not allowing it to be easily washed away, a property that is often of importance in a country subject to heavy downpours of rain.

Ammonia very readily combines with acids, acting as a base, and forming salts of ammonia, generally called ammonium salts. The best known of these are sulphate of ammonia (ammonium sulphate) and sal-ammonias (ammonium chloride). The ammonia in all ammonium salts is easily expelled by the action of lime; one can illustrate this important fact by mixing a small quantity of sal-ammoniac or sulphate of ammonia with a similar quantity of lime, when the ammonia given off is easily perceptible by the smell; in fact, such a mixture forms an efficient filling for smelling-bottles. From this we can see that lime must never be mixed with any manure containing ammonia on pain of losing its most valuable ingredient. This is the reason why Thomas Phosphate (basic slag), which contains free lime, should not be mixed with sulphate of ammonia, and why it is dangerous to put lime on a manure-heap.

Sulphate of Ammonia.

Almost the only form of ammonia compound used as a fertiliser in this country is the sulphate. This should be in the form of a pale bluish-white powder. When chemically pure it contains 21·2 per cent. of nitrogen; but a good commercial sample will give about 20 per cent., equal to about 24·3 per cent. of ammonia. A rough test may be easily

made of its purity by placing a small quantity on a piece of red-hot iron, when it should almost entirely volatilise, or disappear as vapour, as all ammonium salts will. Any residue remaining is an impurity. It is the most concentrated form of nitrogenous fertiliser, and is thought to be most effective on strong clayey soils, but not so suitable for those rich in lime, as a loss of ammonia will probably ensue, due to the action of lime already spoken of. For cereals, potatoes, and turnips it has proved valuable; it may be mixed with bones, superphosphate, and guano, and is the commonest form of nitrogen compound found in "special" fertilisers. Being so rich in nitrogen, about 1 cwt. per acre is usually sufficient to apply.

NITROGEN IN ANALYSIS.

If a chemist has to examine a manure or a soil, one of the chief points he has to report on is the amount of nitrogenous substance it contains; and in order that the relative values of different manures, etc., may be easily compared, he tells us, as a general rule, how much nitrogen there is present, regardless of the particular compound form in which it may exist. He does not usually say there is so much nitric acid, or so much sulphate of ammonia, and so on, but lumps them all together and says there is so much nitrogen. But occasionally we find that instead of this system he calculates how much ammonia the nitrogen is equivalent to, and reports that there are present nitrogenous compounds equal to so much ammonia. It will, therefore, be useful if we can perform the calculation for ourselves, so that we can compare analyses arranged on these different methods. From what was said above as to the composition of ammonia, it will be readily seen that to convert the percentage of nitrogen into its equivalent of ammonia we must multiply the former by 17-14ths of 1·215; and *vice versa*, ammonia may be converted into its equivalent of nitrogen by multiplying by 14·17ths or ·824.

1. What are the chief corstituents of the air?

2. How can you distinguish between an acid and an alkali?

3. If you added ammonia to nitric acid, what compound would you expect to be formed?

4. If you used hydrochloric acid instead of nitric, what would you get then?

5. How could you tell when you had added enough ammonia to neutralise the acid?

6. If a manure contins 8½ per cent. of ammonia, how much nitrogen is that equal to?

7. Why is it wrong to mix sulphate of ammonia with basic slag and not with bone-dust?

8. Could you prove that a piece of flesh contains nitrogen?

A Chat about the Soil.

IV.—THE PHYSICS OF THE SOIL.—(*Continued*).

LAST month, in discussing the Physics of the Soil, we referred to the part which the size of particles of a soil plays, and we also spoke of the questions of porosity and texture. Continuing our discussion, we now come to the question of retentiveness—that is to say, the extent to which a soil is capable of retaining water. The degree of retentiveness of a soil is dependent directly upon its capillarity, which quality again depends upon the proportion of clay or humus present. It is quite easy to realise that the greater proportion of clay in a soil, the more readily will that soil retain water; and also, on the other hand, everyone knows that the sandier a soil is the less retentive of water it must be. These facts are illustrated by the following figures, which show the percentage volume of water which four different classes of soil respectively will hold:

(1) A *Sandy Loam* will hold *17 per cent.*;
(2) A *Loam* will hold *62 per cent.*;
(3) A *Clay Loam* will hold *28 per cent.*;
(4) A *Clay Soil* will hold *34 per cent.*

Here we see that clay will hold twice as much water as a sandy loam; and in some ways this characteristic of clay is of advantage as compared with soils of a sandier nature. For instance, an open sandy soil will certainly let water through easily, but at the same time it will also let the elements of plant food escape also, with the water, whereas, a clay soil, although it has the disadvantage of being too retentive of water, at the same time holds its fertility so that the food elements in any manures that we put on it will be retained. The best soil is one that will allow the water to filter through slowly, a loamy soil, for instance.

Depth is the next physical quality of the soil that we may consider briefly. Ordinary soils all over the world are remarkably constant as regards their depth, varying from three inches to over a foot, but by far the commonest depth being six to eight inches. There are some exceptional soils, and as those of an alluvial nature, that run deeper than the ordinary soil, but the great majority of soil is from four to nineteen inches deep; in Germany it is about the same; in Russia the soil is thin; the New England soils are about six inches deep; the soils of the western prairies of the United States are deeper, running down to eighteen inches in some places; in New Zealand the soils run from four to nine inches, in Australia from four to twelve. A deep soil is, of course, preferable for ordinary agriculture to a comparatively shallow soil, since it provides a large storehouse for the elements of plant food, whilst at the same time, by enabling the roots of the crops to ramify to a greater depth, it renders the plants independent of surface conditions, thus making it easier for

them to resist the attacks of drought than would be the case on shallow soils.

If a soil is deep but has not been cultivated very deeply, it is as well to try and improve it by turning over more soil in ploughing, but care should be taken, if the soil is not very deep, not to go down far, for fear of bringing up too much of the subsoil, which is poisonous and is liable to ruin a field for years. A shallow soil can be deepened by bringing up just a little of the subsoil every now and then. This small quantity of subsoil will mix with the soil proper and become ameliorated by the oxidising of the elements it contains, as well as in other directions.

The matter of the weight of soils need not detain us long, as a few words in passing will be all that will be necessary. The weight of a cubic foot of soil varies greatly, depending as it does upon several factors. First of all, the actual nature of the soil—*i.e.*, whether it is peaty, clayey, loamy, or sandy—has the greatest influence upon the weight of a given quantity; then the soil may have been loosened by cultivation, or settled or pressed down hard. These are the chief factors influencing the weight of soils; but in order to give some idea as to the comparative weights of soils, the following figures will be useful. The samples of soils to which these figures refer were air-dried before weighing:—

A cubic foot of Peaty *soil weighs about* 49 lbs.;
A cubic foot of Clayey *soil weighs about* 66 lbs.;
A cubic foot of Loamy *soil weighs about* 76 lbs.;
A cubic foot of Sandy *soil weighs about* 80 lbs;

It thus appears that a sandy soil is really *heavier* than a clay soil, but the latter is referred to as heavier because of its greater tenacity—as I have said in a previous article, it is spoken of a "heavy" because it is heavy to plough.

The above figures will give an idea of what an enormous weight of soil we move in ploughing. If we plough an acre of land to the depth of five inches only, we have to move some 600 tons of soil!

Soils differ in colour just as they do in other characteristics. Some are dark—even actually black—whilst others are reddish or chocolate, others again are grey, and between these there are innumerable shades of colour to be found. The colour of a soil is, of course, due primarily to the nature of the underlying rock foundations from which the soil has been formed during the ages. The principal colouring matters are humus and oxides of iron. But for these the soil would be white (as instance pipeclay and chalk). The most desirable colour for a soil to have is black, and white is the least desirable. The reason for this is that black absorbs heat while white reflects it; and consequently, other things being equal, it will be easily realised that, as heat is one of the principal factors in the growth of plants, the earliest and best plants will grow on the darker soils, and grey and white will yield stunted crops.

(*To be continued.*)

Weaning Lambs.

THAT there be no checks in the growth of lambs at weaning time the matter should have some consideration that will keep them improving. By providing lamb creeps they will soon learn to eat some grain or ground feed. When the lambs are four months old they should be weaned. It is best for the ewes and also for the lambs. If lambs have learned to eat well, they should be given the same quarters they are accustomed to and the ewes should be put in a barn out of sight of the lambs or there will be more demonstration. By putting the ewes on dry feed and not very much of that the udders will soon dry up. By giving the lambs the best of pasture and access to feed all the time, they will soon take to it and will receive but a slight check to their growth.—*The American Thresherman.*

When to Water Horses.

A HORSE should be watered before feeding, and never given a large quantity of water after a meal, for the simple reason that the water will wash the food out of the stomach before stomach-digestion has taken place, and the food will not be well prepared for absorption; and besides, it is sometimes the cause of colic.

There is a popular idea that a warm horse should not be allowed to drink, and unlike a great many other popular ideas, there is a little truth in it. If you water a warm horse in the ordinary way, letting him drink all that he will, you are likely to have a foundered horse on your hands. This is especially so if, at the time, the horse is fatigued. Nevertheless, it is always safe to allow him from six to ten swallows, no matter how warm he is. If this be given on going into the stable, and he be allowed to stand and eat hay for an hour and is then offered water, he will not drink nearly so much as he would, had none been given him before.

The danger is not in the first swallow, as we often hear it asserted, but in the excessive quantities that he will drink if not restrained. The most dangerous time to give a horse a full draught is when he has cooled down from fatiguing work and has partaken of a meal.—*Hawaaian Planters' Monthly.*

Cracked wheat or maize makes a better feed after the chickens get old enough to eat it than either fed ground fine and made into a mush.

Meteorological Returns.

Meteorological Observations taken at Govt. Stations for Month of October, 1909.

STATIONS.	TEMPERATURE (IN FAHR. DEGS.).				RAINFALL (IN INCHES).					
	Means for Month.		Maximum for Month.	Minimum for Month.	Total for Month.	No. of Days.	Heaviest rainfall in 1 day.		Total for Year from July 1st, 1909.	Total for same period from July 1st, 1908.
	Maximum	Minimum					Fall.	Day.		
Observatory ..	76·2	61·1	88	52·9	2·11	14	·80	31st	10·24	11·93
Stanger ..	80·1	60·1	99	51	2·75	11	1·48	30th	11·62	10·63
Verulam ..	83·9	58·7	94	50	1·83	7	1·24	30th	8·86	10·16
Greytown ..	81·3	46·3	97	35	1·57	10	·37	17th	6·34	10·82
Newcastle ..	84·6	41·5	97	34	1·08	7	·65	30th	4·96	12·23
Umbogintwini ..	78·8	56·9	92	47	2·97	12	1·10	31st	12·00	—
Estcourt ..	83·2	49·5	97	37	·08	7	·07	18th	2·32	6·18
Mid-Illovo ..	75·1	53·2	92	44	2·23	10	·80	30th	9·78	1·73
Ixopo ..	—	—	—	—	1·21	9	·32	30th	6·98	12·21
Imbizana ..	77·1	58·1	88	47	2·46	13	·67	30th	9·22	13·91
Port Shepstone	79·7	54·8	88	48	3·89	8	1·25	29th	11·00	16·90
Umzinto ..	89·5	54·3	95	50	2·35	6	·83	31st	11·48	12·40
Richmond ..	76·7	52·3	96	38	3·94	15	·75	29th	10·93	12·01
Maritzburg ..	80·5	53·7	102	42	1·50	13	·30	30th	6·56	9·48
Howick ..	77·9	51·0	95	38	1·06	6	·28	17th	5·67	9·37
Ladysmith ..	86·8	54·6	99	43	·60	7	·16	22nd	3·78	—
Dundee ..	82·3	54·6	94	42	1·25	8	·25	30th	5·94	8·57
Cam erdown ..	77·5	51·8	97	40	·91	5	·25	14th	6·58	7·58
Krantzkloof ..	72·9	57·7	91	48	2·93	9	1·30	31st	10·28	11·69
New Hanover ..	83·5	50·7	99	30	1·09	9	·36	30th	6·11	11·57
Krantzkop ..	83·3	39·6	95	36	·53	8	·36	17th	4·69	7·42
Lidgetton ..	79·1	42·6	94	34	1·36	9	·39	10th	6·05	9·45
Nongoma ..	76·5	53·9	88	41	1·66	6	1·12	31st	5·75	—
'Ngomi Forest ..	73·4	50·8	91	40	3·85	17	1·33	30th	12·06	—
Nqutu ..	77·0	46·2	90	37	1·19	5	·42	30th	—	7·76
Mtunzini ..	82·8	54·1	95	50	3·15	6	1·45	30th	22·83	17·38
Hlabisa ..	81·3	59·6	95	53	3·41	6	2·30	30th	10·12	9·73
Melmoth ..	80·1	56·1	102	47	1·09	6	·48	18th	5·54	8·19
Ubombo ..	76·0	57·5	90	48	3·77	4	2·00	10th	8·44	12·38
Empangeni ..	81·7	59·3	97	50	2·56	4	1·68	30th	13·78	14·35
Point ..	—	—	—	—	2·37	8	1·00	31st	12·81	13·53
Nottingham Rd.	76·0	41·9	93	31	·55	4	·30	11th	3·30	—
Char estown ..	74·3	45·0	87	35	2·54	15	·61	11th	4·46	7·66
Utrecht ..	92·3	42·2	98	38	·68	1	·68	31st	3·07	—
Vryheid ..	76·9	52·1	96	43	1·52	8	·61	31st	5·20	11·60
Mahlabatini ..	86·2	50·6	98	38	1·66	4	1·08	30th	6·14	8·22
Bulwer ..	—	—	—	—	1·42	15	·54	30th	6·01	11·96

Meteorological Observations taken at Private Stations for Month of October, 1909.

STATIONS.	TEMPERATURE (IN FAHR. DEGS.)		RAINFALL (IN INCHES).					
	Maximum for Month.	Minimum for Month.	Total for Month.	No. of Days.	Heaviest rainfall in 1 day.		Total for Year from 1st July, 1909.	Total for same period from July 1st, 1908.
					Fall.	Day.		
Adamshurst	101	40	0·71	6	0·30	10th	—	8·5
Hilton	4	39	1·05	14	0·23	4th	6·43	9·57
P.M.B., Botanical Gardens ..	—	—	1·53	12	0·26	1 th	6·93	9 46
Ottawa	—	—	2·51	9	1·3	31st	10 05	—
Mount Edgecombe	—	—	3·03	13	1·80	31st	11·71	11·77
Cornubia	—	—	2·73	—	—	—	12·12	—
Milkwood Kraal	—	—	1·69	—	—	—	8·09	—
Blackburn	—	—	2·21	—	—	—	10·5	—
Saccharine	—	—	2·4	—	—	—	10·29	—
Equeefa	92	53	2·54	10	0·65	3 st	9·88	11·95
Umzinto, Beneva	—	—	1·44	5	0·65	30h	8·73	10·87
Umhlangeni	—	—	3·16	12	0·6	3 th	1·25	—
Eshowe	—	—	2·50	6	1·40	31st	—	—
Riet Vlei	—	—	0·34	7	0·11	17th	3·19	8·75
Cedara—Hill Station	96	35	0·97	8	0·34	31s	3·82	—
Winkel Spruit	84	48	2·39	8	0·67	29th	11·16	13·35
Weenen	100	40	0·06	1	0·06	17th	2·76	—
Giant's Castle	8	52	1·71	8	0·35	25th	5·36	8·05

Coal and Labour Return.

Return of Coal raised and Labour employed at the Natal Collieries for the month of October, 1909:—

COLLIERY.	Average Labour Employed.					Output.	
	Productive Work.			Unproductive Work.*	Total.		
	Above Ground.	Below Ground.	Total.			Tons.	Cwt.
Natal Navigation ..	370	647	1,017	18	1 035	27,024	—
Durban Navigation ..	255	584	839	—	839	16,928	—
Elandslaagte	285	597	882	10	892	14,071	10
St. George's	208	418	626	15	641	13,169	—
South African	129	301	430	69	499	12,714	5
Dundee Coal Co. ..	252	425	677	—	677	10,465	13
Natal Cambrian ..	223	330	553	3	556	10,044	12
Glencoe (Natal) ..	173	309	482	36	518	9,139	6
Talana..	113	388	501	17	518	8,146	5
Newcastle	80	384	464	—	464	6,993	14
Hatting Spruit ..	86	151	237	—	237	5,805	16
Natal Steam Coal Co. ..	91	214	305	—	305	5,475	19
Hlobane	87	204	291	20	311	4,366	15
Ramsay	78	120	198	13	211	3,744	9
West Lennoxton ..	56	86	142	—	142	1,686	13
Ballengeich	62	107	169	16	185	1,020	17
§Dewar's Anthricite ..	10	14	24	—	24	117	—
‡Mooiklip . ..	—	27	27	—	27	78	—
Burnside	—	—	—	326	326	46	6
Makatees Kop ..	3	—	3	—	3	6	—
Totals	2,561	5,306	7,867	543	8,410	151,044	0
Corresponding month, '08	2,183	4,797	6,980	765	7,745	128,016	15

	Productive Work.			Unproductive Work.	Total, Oct., 1909.	Total, Oct., 1908.
	Above Ground.	Below Ground.	Total.			
Europeans	194	168	362	77	439	387
Natives	878	3,278	4,156	299	4,455	4,201
Indians	1,489	1,860	3,349	167	3,516	3,157

* Cost Charged to Capital Account. § Includes September Return. ‡ August and September returns.

CHAS. J. GRAY,
Commissioner of Mines.

Mines Department, Maritzburg, 6th November, 1909.

RETURN OF COAL BUNKERED AND EXPORTED.

Return of Coal bunkered and exported from the Port of Durban for the month of October, 1909:—

	Tons.	Cwt.
Bunker Coal	74,316	12
Coal Exported	35,381	5
Total ..	109,697	17

Customs House, Port Natal,
1st November, 1909.

GEO. MAYSTON,
Collector of Customs.

Return of Farms at Present under Licence for Lungsickness and Scab.

STOCK INSPECTOR.	DISTRICT.	DISEASE.	OWNER.	FARM.
A. P. Craw ..	Ladysmith ..	Scab	Mrs. M. J. v d Merwe	Coolfontein
		,,	Natives ..	Roosboom
		,,	Natives ..	Marie's Kraal
		,,	Natives ..	Goedgedacht
		,,	Natives ..	Roodpoort
		,,	B. J. Nieuabar ..	Tylden
		,,	P. Bartlett ..	Uithol
		,,	R. A. Smith ..	Lombard's Kop
		,,	J. Kumalo	Driefontein
		,,	H. Illing	Krantzkloof
A. B. Koe ..	Portion of Estcourt	,,	R. Mattison ..	Calcott
		,,	J. v d Merwe ..	Lands End
		,,	J. F. Hopkins ..	Highfield
A. C. Williams ..	Utrecht ..	,,	D. Hartman ..	Rooikop
		,,	J. de Winnaar ..	,,
		,,	C. Potgieter ..	Nitkomst
		,,	P. Truter ..	Weigevonden
		,,	— Lekhoff ..	Bate Spruit
		,,	Y. Hambridge ..	Strydfontein
		,,	Natives ..	Roodekoppen
		,,	L. de Jager ..	Waterval
		,,	Natives ..	Quaggasdrift
		,,	G. J. Keel ..	Ventersplaats
		,,	T. Uys ..	Zoetsmelk River
		,,	S. Grobler	Kimpley
		,,	P. L. Uys	Waalhoek
L. Trenor ..	Alfred ..	,,	Yalwayo ..	Location
		Lungsickness	J. T. Clothier ..	Whitecliff
		,,	Sigumu ..	Lot F
		,,	Mqunansla ..	Omega
		Scab	Natives ..	Location No. 1
J. R. Ife ..	Lion's River ..	,,	G. M. Trickett ..	Cowick Commonage
		,,	Geo. Woodhouse ..	Halliwell
		,,	W. G. Shaw ..	Colbourne
		,,	P. Marais ..	Maketeeskop
K. Ripley ..	Intonjaneni ..	,,	S. Ferriera ..	Diepkloof
		,,	Natives ..	,,
C. T. Vaughan ..	Paulpietersburg ..	,,	F. D. Wilson ..	Nineve
		,,	J. H. Potgieter ..	Lachkraal
		,,	H. Rohrs ..	Altona
R. Wingfield Stratford	Newcastle ..	,,	Schwikkard & Co. .	Boscobello
		,,	Natives ..	Koppie Alleen
		,,	E. J. Dicks ..	Essenwood
		,,	A. M. Muller ..	Droogdal
		,,	A. Towile ..	Majuba North
		,,	J. van Rooyen ..	Asvogelskop
		,,	L. P. de Jager ..	Sluiteldraai
		,,	F. R. Muller ..	Leyden
		,,	J. J. Duigenaar ..	Langton
		,,	M. P. de Jager ..	Muller's Pass
		,,	A. J. Johnstone ..	Battlefield
		,,	Natives	Highvale
		,,	G. Dimock	Alicedale
C. E. Walker ..	Portion of Estcourt	,,	L. Lloyd ..	Hidcote
		,,	J. W. Haw ..	Woodleigh
		,,	J. Marais Jun. ..	Northcote
		,,	Johnson & Clarke..	Bergonis
G. Daniell ..	Vryheid ..	,,	Mrs B. Webbe ..	Rustemburg
		,,	C. Beneke ..	Langkrans
		,,	A. Armstrong ..	Lekkerwater
		,,	G. van der Wenter	Tintasdrift
		,,	A. T. Davel ..	Brackspruit
		,,	Natives ..	Tinta's Drift
		,,	B, E. A. Rabe ..	Enyati
		,,	M. T. Ferreira ..	Vaalkrans
		,,	Natives ..	Waterfall
		,,	J. van Rooyen ..	Welkeveden
		,,	J. A. K. van Rooyen	Rustplaats
		,,	H. de Bruin ..	Rordepoort
		,,	C. van Rooyen ..	Rooikop
		,,	L. van Rooyen ..	,,
J. R. Cooper ..	Nkandhla & Nqutu	Scab	J. van Rooyen ..	Bedrog
		,,	Natives ..	Selutshana
		,,	,, ..	Nqutu

RETURN OF FARMS UNDER LICENCE *(Continued)*.

STOCK INSPECTOR.	DISTRICT.	DISEASE.	OWNER.	FARM.
J. R. Cooper ..	Nkandhla & Nqutu	Scab	Natives ..	Telezi
		,,	,, ..	Mkonjana
		,,	,, ..	Nondweni
		,,	,, ..	Mafethling
		,,	,, .	Hlozagazi
		,,	,, ..	Dalala
		,,	,, ..	Nqudeni
		,,	,, ..	Gadaleni
		,,	,, ..	Mawoni
		,,	,, ..	Mafethleni
		,,	,, ..	Haladu
		,,	Westbrook Bros. ..	Dalton
		,,	J. A. de Waal ..	Mazenkomo
E. Varty ..	Western Umvoti ..	,,	D. C. S. Nel ..	Highfield
		,,	J. A. Graham ..	Driefontein
		,,	H. Hansmeyer ..	Onres
		,,	T. J. Maritz ..	Mt. Alida
		,,	F. R. Nel ..	Vermaak's Kraal
E. W. Larkin ..	Umsinga ..	,,	Susezulu ..	Umsinga
		,,	Natives ..	Location
		,,	,, ..	Gordon Memorial
		,,	,, ..	Vaalkop
		,,	T. H. Dedekind ..	Harding
		,,	Natives ..	Umsinga
		,,	,, ..	Myonyama
		,,	P. V. Strydom ..	Hill Crest
R. Mayne ..	Eastern Umvoti & Krantzkop ..	,,		
		,,	Natives ..	Burleigh
		,,	J. M. Zietsman ..	Paul's Rest
		,,	Natives ..	,,
		,,	L. G. Nel ..	Glenboig
		,,	Van Rooyen Bros..	Wonderfontein
		,,	P. R. Bester ..	De Rust
			J. A. Nel ..	Dingley Dell
		,,	L. M. J. van Rooyen	Scotsdale
		,,	S. C. van Rooyen ..	Overvloed
E. W. Bowles ..	Ixopo ..	,,	Tshelwana ..	A of S 55
		,,	Bobejana ..	Lot K of 5
		,,	Natives	Batmand
		,,	,, ...	Location No. 8
		,,	,, ...	Lot BB
		,,	,, ...	Lot A of 8
A. H. Ball ..	Weenen..	,,	J. P. Lotter ..	Berg Vleit
		,,	P. H. Van Rooyen	Buffels Hoek
		,,	P. P. van Rooyen ..	Doornkloof
		,,	Naude & Lotter ..	Scottshoek
		,,	J. T. van Rooyen	Belle Vue
		,,	R J J van Rooyen, Sr	Bird Spruit
		,,	L. J. Fourie ..	Scottspoort
		,,	P. R. Buys ..	Waterfall
		,,	P. H. van Rooyen..	Buffel's Hoek
		,,	T. C. Lotter ..	Waterfall
		,,	Natives ..	Belle Vue
		,,	Umveli ..	Zwaartkop Location
A. F. Smith (acting)	City, Umgeni..	,,	Dria ..	,,
		,,	Samuel ..	,,
		,,	Jantje ..	,,
		,,	Laduma ..	,,
		,,	E. Taylor ..	Taylor's Station
		,,	Ramen ..	Ellis' Estate
A. J. Marshall ..	Dundee ..	,,	Natives ..	Conterford
		,,	McKenzie & Kruger	Dabray
		,,	Natives ..	Klipport
		,,	,, ..	Biggersgat
		,,	J. de Jager ..	Waschbank
		,,	Natives ..	Blinkwater
		,,	,, ..	Hartebeestfontein
		,,	,, ..	Kamelboom Kop
		,,	G. F. Dannhauser..	Cardwell
		,,	J. J. Gregory ..	Cotswold
		,,	T. C. Koekmoor ..	Maybole
		,,	N. B. Swarts ..	Rooikop
		,,	H. P. Walker ..	Town Lands
		,,	C. J. Pieters ..	Zwaartwortes
		,,	Mrs S. J. Kemp ..	Kelvin
		,,	S. B. Jones	Carnarvon
		,,	Natives	Banff
B. Klusener ..	Lower Umzimkulu	Lungsickness	Nyapu	Berbeck

Division of Agriculture and Forestry Notices.

FEES FOR AGRICULTURAL ANALYSIS.

It is hereby notified that Farmers and others can secure analytical determinations from the Government Laboratory, Central Experimental Farm, Cedara, in accordance with the following scale of fees, which is subject to revision :—

	Scale I. £ s. d.	Scale II. £ s. d.
FERTILISERS AND FEEDING STUFFS :		
Determination of 1 constituent	0 7 6	0 5 0
Determination of 2 or 3 constituents	0 15 0	0 10 0
Complete analysis	1 1 0	0 15 0
SOILS : Partial analysis of a soil in relation to its fertility	1 1 0	0 10 6
Complete analysis of a soil	2 2 0	1 1 0
WATER : Irrigation and drainage	1 10 0	0 10 6
VEGETABLE PRODUCE : Fodder, Ensilage, Grain, &c.	1 10 0	0 15 0
MILK, CREAM, BUTTER : Fat only	0 5 0	0 2 6
,, ,, : Complete	0 15 0	0 7 6
WATTLE BARK AND TEA : Tannin	0 5 0	0 2 6
CATTLE DIPS : Quantitative analysis of 1 to 3 principle constituents	0 10 0	0 5 0
INSECTICIDES :		
Qualitative analysis each constituent	0 5 0	0 2 6
Quantitative ,, ,, ,, ...	0 10 3	0 5 0

Scale No. 1 is applicable to samples handed in by merchants and Dealers, and where trade interests are involved.

Scale No. 2 is applicable to samples forwarded by *bona fide* Farmers and Gardeners.

Samples will be accepted at the discretion of the Director, and must be properly selected and labelled.

The Department reserves the right to publish the results of any analysis performed by it ; and, where such is deemed of sufficient public interest, it will remain at the discretion of the Director to remit any charges hereunder.

TREES FOR SALE.

To encourage tree-planting, transplants and seeds of forest trees are supplied by Government, so far as in stock, at the undermentioned rates, exclusive of carriage, from the Government Nursery, Central Experimental Farm, Cedara.

Transplants of Eucalyptus, Pines, Acacias, Casaurinas, Cupressus, etc., about 25 trees in each tin, at 8s. 4d. per 100 trees. Trees in separate tins at 1s. each.

Transplants of scarce kinds, larger trees, or surplus stock, when available, will be charged at special rates, which will be furnished on application.

Tree seeds, in variety, at 6d. per packet. Price per pound, which fluctuates, will be furnished on application.

Package and postage of seed, when required, charged 1s. per lb. extra.

PURCHASE OF TREE SEEDS.

With a view to the encouragement of seed production in the Colony, offers are invited from persons having locally-grown seed of exotic trees for Sale. Not less than one pound will be purchased ; and a specimen bearing seed vessels or flowers should be sent for identification purposes.

SILVER POPLAR.

Root suckers of the Silver Poplar (*Populus alba*) can be supplied in any quantity, at 8s. 4d. per hundred, on application.

POULTRY.

Orders will be received for eggs for sitting of the following breeds for immediate delivery :—Buff Orpingtons, White Leghorns, Silver Wyandottes and Plymouth Rocks,

PERSIAN SHEEP.

An imported Woollen Persian Ram may be hired for the season at a fee of £5, at hirer's risk. Particulars on application. Orders for Haired Persian Rams will be booked for future delivery.

WOOLLED SHEEP.

Offers are invited for young imported Rams being Rambouillet Merinos, Lincolns, Hampshires, Shropshires. Inspection can be arranged to suit intending purchasers.

CORRESPONDENCE.

Communications relating to the following subjects should be addressed in the first place to the officers responsible :—

Admittance of Students to the School of Agriculture.—House Master, Cedara.
Analyses of Soils, Fertilisers, etc.—Analyst, Cedara.
Felling Licenses, Purchase of Timber Sections and Squatters' Holding in Crown Forests.—Chief Forest Officer, Ixopo.
Afforestation, Timber Trees and Seeds.—Chief Afforestation Officer, Cedara.
Agricultural Seeds, Livestock, etc.—Farm Manager, C.X.F., Cedara.
Tropical Plants, Seeds, etc.—Manager, Government Farm, Winkle Spruit.
Agricultural Seeds, etc., for Irrigation Farming.—Curator, Govt Station, Weenen.
Fruit.—Orchardist, Cedara.
Accounting Business.—Accounting Clerk, Cedara.
Woolled Sheep, Woolled Classings, &c.—Wool Expert, Cedara.
Apiculture—Apiarist, Cedara.

E. R. SAWER,
Director, Division Agriculture and Forestry, Cedara.

Pound Notices.

NOTIFICATION is contained in the *Government Gazette* of the sale, unless previously released, of the undermentioned live stock on the dates specified :—

ON THE 15TH DECEMBER.

Camperdown—Black Kafir sheep, ram, no brands or marks.

Hatting Spruit, Dundee—Merino lamb, branded W near side, snick in left ear, and piece cut out of front of right ear.

Muden—Dark brown mule gelding, branded X on right thigh, L J M on both front hoofs, marks of harness; light brown mule mare, star on forehead, branded V (in circle) on right thigh, H on left thigh, L J M on both front hoofs, marks of harness

Solferino, Gourton—Running on Mr. Hattingh's farm "Amatamo," and unable to be driveu to the Pound : Black ox, branded on the right hip, indistinct. Seven Persian rams, black and white.

Umsinga—Running on the farm "Balgownie," and reported to be too wild to be driven to the Pound : Unbroken grey mare branded (P2) on right hind quarter, and black yearling filly.

ON THE 22ND DECEMBER.

Donnybrook—Black ram goat, probable value 3s., impounded on the 23rd October, 1909, by Natal Police, Mabedhlana ; white ram goat, probable value 5s., impounded on the 2nd November, 1909, by A. E. Smith, Dronk Vlei.

Hlomo Hlomo, Ngotshe—Black stallion, no brand or ear mark, about 3 years old, probable value £10, impounded on the 4th November, 1909, by A. Delport, "Wonderfontein."

ON THE 5TH JANUARY.

Donnybrook—Black ewe goat ; white ewe goat ; black and brown ewe goat.

Inhlazatye, Vryheid—Ewe goat, blue and white, poor condition ; white ewe goat, lamb of above, poor condition, no ear marks.

Qudeni—Chestnut filly, about two years old, standing about 13 hands, appears to have slight nicks in ears.

Umsinga—Bay mare, branded C.B. on right leg, I.C. on right leg, 89 on right shoulder.

NOTICE.

In terms of the provisions of the Pound Act, 1898, the Pound at Scotston, Polela Division, will be abolished, with effect from date hereof.

Brands Allotted to Infected Magisterial Divisions.

The following is a list of the brands which have been allotted to the several infected Magisterial Divisions:—Durban County, D. 2; Alexandra County, A. 2; Lower Tugela, T. 2; Mapumulo, S. 2; Inanda, B. 2; Umsinga, U. 2; Dundee, X. 2; Vryheid, V. 2; Ngotshe, H. 2; Paulpietersburg, P. 2; Nongoma, G. 2; Mahlabatini, L. 2; Ndwedwe, N. 2; Weenen County, W. 2; Umvoti, F. 2; Hlabisa, K. 2; Eshowe, E. 2; Ladysmith, R. 2; Babanango, O. 2; Ladysmith, East of Line outside infected area, R. 3; Utrecht, Z. 2; Krantzkop, 2 K.; Umvoti Location, 2 F.; Ladysmith, West of main line of Railway, R. 3 on left neck; Pietermaritzburg City, 2 P.; Umlazi Location (Upper Umkomanzi portion), 2 U.; Umgeni Division, west of line, J. 2; Lion's River, east of line, 2 H.

Farm Apprentices' Bureau.

LIST OF APPLICANTS.

THE following is a list of the applicants which have so far been received by the Editor of the *Natal Agricultural Journal* from boys desirous of obtaining positions on farms. Farmers wishing to get into communication with any of these applicants should address their enquiries to the office of this journal.

The majority of the applicants have, of course, had no farm experience, but all appear to be strong, healthy and willing.

No. 2.	Age 15.	Has had 18 months' experience of farming. Understands more about forestry than general farming. Speaks Zulu, and understands Dutch.
,, 3.	Age 24.	Colonial born Has a knowledge of bookkeeping.
,, 11.	Age 18.	Has had two years' experience on a sheep farm in the O.R. Colony. Is particularly anxious to get back on a farm. Is very willing and obedient.
,, 13.	Age 20.	Is an orphan. Is anxious to learn farming.
,, 15.	Age 19.	Is desirous of learning farming.
,, 25.	Age 23.	Bricklayer by trade. Is anxious to get on a farm.
,, 27.	Age 19.	Has had one year's experience on a farm in the Cape Colony.
,, 30.	Age 18.	Transvaal born. Has had experience on a mixed farm. Speaks Dutch and Zulu.
,, 34.	Age 18.	Has a slight knowledge of Zulu. Understands carpentry.
,, 35.	Age 21.	Has had five years' experience on farms. Understands cattle and horses and Agriculture. Is anxious to get back on a farm.
,, 39.	Age 19.	Has had twelve months' experience on a fruit farm in the Cape Colony. Speaks Dutch.
,, 40.	Age 24.	Has had a little experience of farm life. Understands bee-keeping. Is anxious to get on a farm.
,, 41.	Age 16.	Has not had any experience. Speaks Zulu. Understands carpentry. Has been engaged in a Solicitor's office for four years. Is very obliging and willing. Anxious to get on a farm.
,, 43.	Age 21.	Has a knowlege of Zulu. Plumber by trade. First-class references.
,, 44.	Age 19.	Strong, tall and healthy, good rider, fond of stock, and has some years' experience of general farming. Small salary required with board and lodging.
,, 45.	Age 19.	Has had five years experience on agricultural farms at Ladysmith and Richmond. Speaks Zulu. Is anxious to get back on to a farm.

Employment Bureau.

THE Department of Agriculture has received applications from the undermentioned, who are prepared to become assistants or apprentices on farms. The Department will be glad to hear from farmers willing to take young men as assistants, and to place them in correspondence with the various applicants. Communications should be addressed to the office of this *Journal*.

No. 115.—Englishman, 26 years of age, steady and an abstainer, with a knowledge of cattle and horses, wishes employment on a farm in Natal (English preferred) as a handy man, with a view to furthering his knowledge of farming in this country. Is willing to accept food and clothing in a good home, for services, for a few months with the prospect of a small wage after the first three months.

No. 116.—Cape man, age 32 years; married, no children. Has been used to working with horses and mules all his life. Has good papers from his previous employers, and was in the employ of the Public Works Department for over five years. Is willing to do anything in his power, but cannot read nor write.

No. 117.—Englishman, 25, of good education, desires appointment as overseer on a plantation in Natal, and would pay a reasonable premium and give services free for a few months if necessary. Has had commercial, engineering, surveying and mining experience.

No. 118.—Pensioner from the Army desires to obtain post on a farm. Is particularly fond of gardening. Has excellent discharge papers and good testimonials.

No. 119.—Lady, experienced in dairy work, is desirous of taking charge of a dairy. Has gone through a course of butter and cheese-making, and holds good testimonials from Mr. J. Marshall Douglas, Chairman of the Royal Agricultural Society of England (1905).

No. 121.—Desires open air employment. Age 43. Life experience of agricultural pedigree and prize stock gained in Scotland. Has been six years in South Africa. First-class references and testimonials. Small salary required.

No. 122.—A young man, with life-long experience of cane-growing, desires employployment as manager or overseer on a plantation. Experience has been in Queensland and Fiji. Is good at figures and capable of taking charge of books if necessary.

No. 123.—Married man, 35 years of age, with 5 years' experience on poultry and stock farm in California, wishes to get on to a farm in Natal. His wife is a good cook and handy in dairy. Would be willing to work for a very small wage or for their keep or a period of twelve months at least, after which they would expect some remuneration. Can produce first class personal references.

No. 124.—Practical man, age 35, unmarried, seeks position on any work. Can undertake or attend to any building work and erection of machinery, and has been accustomed to control of coloured labour. Could undertake management of small creamery Not afraid of work. Has had considerable experience in Agriculture, and can produce highest references.

No. 125.—Single man, age 31 years. Was brought up on a farm in England. Is a tinsmith and plummer by trade, also has a good knowledge of carpentry. Speaks Dutch. Has been in South Africa for ten years.

No. 126.—Colonial, 35 years of age, desires to obtain a position as overseer or manager of an ostrich farm. Has been for some years with first-class farmers, and had charge of some of the best birds in the Cape Colony. Has a practical knowledge of incubating, rearing of chicks, dosing and general management.

No. 127. An expert fruit packer of four years' experience in Spain and France, and twenty years Colonial experience, is open to accept an engagement up to February, 1910. He is open to accept low wages, with board and lodging, and fare to and from the Cape where he is at present.

No. 128.—Wishes to secure employment on a farm. States that he has a genera knowledge of engineering, and has been employed on a large and well-known farm in the Richmond Division.

Farmers requiring good, steady farm hands would do well to communicate with Ensign Anderson, of the Salvation Army Shelter, Maritzburg, who constantly has good men at the Shelter who would be glad of employment at reasonable rates. Ensign Anderson pledges himself not to recommend for employment any but those he is satisfied will give satisfaction to their employers. He will be pleased to enter into correspondence with any farmer who may address him on the subject.

Diamond Drilling.

SOME of the departmental diamond drilling plants are at present disengaged and available for hire for boring for either minerals or water. Particulars as to terms of hire may be obtained from the undersigned.

CHAS. J. GRAY,
Commissioner of Mines.

Land and Agricultural Loan Fund.

The Land and Agricultural Loan Fund has now been established, and the Board are prepared to receive applications for advances on security of first mortgage on fixed property. Appilcations must be made upon special printed forms, which can be obtained, together with full particulars as to the conditions under which advances are made, from the office of the Fund, Colonial Offices, Pietermaritzburg.

All Correspondence should be addressed to the Secretary, Land and Agricultural Loan Fund, P.O. Box 357, Pietermaritzburg.

Notice.

OWING to the increasing demands upon our space, we have arranged to publish *quarterly* instead of monthly as hitherto certain standing reference matter. This matter will consist of (1) Scale of Charges for Vaccines, etc., at the Government Laboratory; (2) List of East Coast Fever Advisory Committees; (3) List of Executives of Farmers' Associations; and (4) List of Publications issued by the Department of Agriculture. In future readers will find this matter in the January, April, July and October issues of the *Journal*.

Do not let the cream stand around in an open pan or pail. Shut it up in a close pail or jar, where the air can not get to it. Bacteria mean nothing more or less than impure air coming in contact with the milk or cream.

Government Cold Stores and Abattoirs.

PIETERMARITZBURG.

It is notified for the information of Farmers and others that Government is prepared to receive Cattle at the Government Abattoir, Pietermaritzburg, for Slaughter and Storage, if necessary, upon the following Scale of Rates and Charges, or such of them as may meet the requirements of Cattle owners. It must, however, be understood that owners will be required to make their own arrangements for the sale of the meat of cattle sent in for slaughter, the Government being unable to offer facilities or to accept responsibilities in this regard.

Cattle may also be received for slaughter at the Government Abattoir, Point, Durban, at the charges noted below. As the Government is unable to offer facilities for cold storage at Durban, or for the sale of the meat of cattle sent for slaughter, it must be understood that owners will be required to make their own arrangements in these respects, and the Government is unable to accept responsibility in either regard at Durban.

		Calves up to One Year old.	Cattle over One Year old.	For minimum number of 250 head per month.		For maximum number of 500 head per month.	
				Under 300 lbs. weight.	Over 300 lbs. weight.	Under 300lbs. weight.	Over 300lbs. weight.
		s. d.	s. d.	s. d.	s. d.	s. d.	s. d.
1.	Receiving ... ... per head	0 3	0 6	0 6	0 6	0 3	0 3
2.	Killing and Cleaning ... ,,	2 3	3 6	2 9	3 3	2 6	3 0
3.	Labour ... ... ,,	0 3	0 6	0 3	0 6	0 3	0 6
4.	Disinfectants ... ... ,,	0 1	0 1	0 1	0 1	0 1	0 1
5.	Bagging (4 Quarters) ... per body	1 9	3 0	2 6	2 9	2 3	2 6
6.	Cleaning of Tripes ... ... each	0 6	0 6	0 6	0 6	0 6	0 6
7.	Chilling of Beef, up to 72 hours or portion thereof ... ... per body	1 0	2 9	2 0	2 6	1 9	2 6
8.	Chilling of Offal, up to 72 hours or portion thereof ... ... per set	1 0	1 0	1 0	1 0	1 0	1 0
	Chilling and Freezing Beef—						
9	1st week or portion thereof per body	2 0	4 6	3 9	4 0	3 6	3 9
10.	2nd ,, ,, ,, ,,	1 0	4 0	3 3	3 6	3 3	3 3
11.	3rd and remaining weeks or portions thereof ... ,,	0 8	3 0	3 0	3 0	3 0	3 0
	Chilling and Freezing Offal—						
12.	1st week or portion thereof per set	1 4	1 6	1 4	1 4	1 4	1 4
13.	2nd ,, ,, ,, ,,	1 0	1 3	1 0	1 0	1 0	1 0
14.	3rd and remaining weeks or portions thereof ... ,,	0 9	1 0	0 9	0 9	0 9	0 9

A charge of 1s. per head is made in respect of any Sale of Cattle on leg at the Government Abattoir and a similar charge is made in respect of Bodies of Beef or portions thereof.

For further particulars apply to the Manager, Government Cold Stores.

Department of Agriculture, Maritzburg, 21st December, 1908.

When you clean out the hen house, be sure to clean out all the nests and thoroughly spray them before putting in new straw or hay. They require as much and more attention than the roosts.

NATAL GOVERNMENT RAILWAYS.

RATE FOR CONVEYANCE OF SECOND-HAND TRACTION ENGINES AND TRUCKS.

IT is hereby notified that a specially low rate has been arranged for the conveyance of second-hand traction engines and trucks from the neighbouring Colonies to Natal, required for transport purposes as a consequence of the East Coast Fever regulations. This rate has immediate effect, and particulars may be obtained on application to the Rates Office, Durban.

General Manager's Office, Natal Government Railways,
Maritzburg, October 23rd, 1909.

RATES ON SOUTH AFRICAN ROUGH SAWN TIMBER.

IT is hereby notified that an alteration has been made in the rates for South African rough sawn timber in through traffic between N.G.R. and C.S.A.R. stations.

The following are the rates chargeable from the undermentioned stations to Johannesburg :—

From—	Per ton of 2,000 lbs. £ s. d.
Richmond	1 16 11
Maritzburg	1 15 9
Greytown	1 18 6
Hilton Road	1 15 4
Vryheid	1 11 7

Full particulars of the rates and conditions applicable to this traffic may be had on application to the Rates Office, Durban.

HEDLEY SALMON,
Acting General Manager.

Head Office, Maritzburg,
17th November, 1909.

SOUTH AFRICAN STUD BOOK.

A record of all classes of Stock; the object being to encourage the breeding of thoroughbred stock and to maintain the purity of breeds, thus enhancing their value to the individual owner, and to the country generally.

Application for Membership and Entries of Stock should be addressed:—

For CAPE COLONY .. .. A. A. PERSSE, P.O. Box 703, Cape Town.
„ TRANSVAAL .. .. F. T. NICHOLSON, P.O. Box 134, Pretoria.
„ ORANGE RIVER COLONY .. E. J. MACMILLAN, Government Buildings, Bloemfontein.

THE SOUTH AFRICAN STUD BOOK

IS OBTAINABLE OF :—

T. MASKEW MILLER,
ADDERLEY STREET, CAPETOWN.

PRICE 10s. 6d.

A. A. PERSSE,
SECRETARY, SOUTH AFRICAN STUD BOOK ASSOCIATION.

Save Money

ON YOUR OIL ENGINE

BY BURNING THE EXCELLENT
POWER PRODUCING PARAFFINE

CROWN OIL

IT'S CHEAPER,
AND WILL GIVE GOOD RESULTS
AT LOWEST COST.

As a household oil it is also useful and cheap.

THIS OIL IS

CERTAIN DEATH TO LOCUSTS.

**Used as a Spray
it kills them instantly and will
save your valuable crops from
being destroyed.**

ASK YOUR DEALER TO SUPPLY YOU.

Farmers' Notice!

LIVE STOCK.

FARMERS desirous of Buying or Selling Live Stock will do well to communicate with us. We have always on hand, or to arrive, First-class Breeding Heifers, also Bastard or Merino Ewes. We are also prepared to supply Brood Mares, Stud-Stallions, Donkeys, Trek Oxen, Mules, Horses, etc.

PRODUCE.

Produce of every description sold on commission to best possible advantage.

TERMS PROMPT CASH. STORAGE PROVIDED.

Cash advanced on goods stored with us for sale.

Weekly Price Lists free on application.

Correspondence invited and promptly replied to.

REFERENCE:

African Banking Corp., Ltd., Johannesburg.

Hubert Morisse & Co.,

(ESTABLISHED 1901),

Live Stock, Market & Commission Agents.

MAIN STORES:

Loveday and Frederick Streets, Johannesburg.

P.O. Box 63. **Branch Store: Ophirton.** Tel. Address: "Naval."

LIVE STOCK . .
. . INSURANCE.

THE . . .

YORKSHIRE INSURANCE Co., Ltd.

RESERVE FUNDS EXCEED TWO MILLIONS.

The Undersigned are prepared to issue policies on HORSES and other EQUINE STOCK against mortality from disease or accident.

Full particulars and proposal forms on application.

SHOW RISKS.

Transit by rail, etc., including time on show and return, covered at reasonable rates.

Insurance of all kinds effected, Fire, Marine, Accident, Life, etc.

CHAMPION & CO.,

General Insurance Brokers,

FIELD STREET, DURBAN.

Box 117. Tel. Add.: "Championed, Durban."

Insurance of Mealies and other produce from place of origin to England or Continent or any part of the world, including risk of fire whilst awaiting shipment, at very low rates.

Important . . .

To Farmers.

Messrs. Lennon, Limited, beg to notify to the Farming community that they are now holding large stocks of all CHEMICALS for FARM use.

Sulphur. Ram's Head Brand.

Sulphate of Iron (Copperas). Ram's Head Brand.

Sulphate of Copper (Bluestone). Ram's Head Brand.

Arsenic.
Caustic Soda.
Washing Soda.
Bisulphide of Carbon.
Cattle Salts.
Epsom Salts.

Depôt for Bentley & Vanderpump's CONDITION POWDERS for Horses. It keeps them in good condition and prevents Horse Sickness.

Medicines for Cattle, Horses, Dogs, Poultry, etc., made up to Farmers' own recipes.

Disinfectants for Farm Use.

Write to us for quotations:—

LENNON, LIMITED,

Wholesale Chemists, DURBAN.

The Three Best Soaps in the Market.

Anderson's Pearl Soap.
Anderson's Three Crowns Soap.
Anderson's A 1 Blue Mottled Soap.

Why they are the Best.

Because they contain NO injurious chemicals, and therefore do NOT spoil the clothes.

Why you should use them.

1st. Because they are best value for your money.

2nd. Because they are made in the Country, and by supporting the country you live in you are supporting yourself.

MANUFACTURERS:

The Natal Soap Works, Ltd.,

P.O. BOX 44. **. . Durban.**

Summer Planting

SEASON 1909–10.

MAGNIFICENT STOCK OF

Orange, Lemon

And Other

Citrus Fruit Trees

In all the leading varieties. Guaranteed true to name and sold in accordance with the Government Ordinance for preventing the introduction of Insect pests and plant diseases.

TRADE



MARK

Trees delivered free to any Railway Station in South Africa at from **2s.** to **4s.** per tree, according to size of tree and quantity ordered.

For full particulars see new Catalogue, sent post free on application to :—

H. E. V. Pickstone & Bro.,

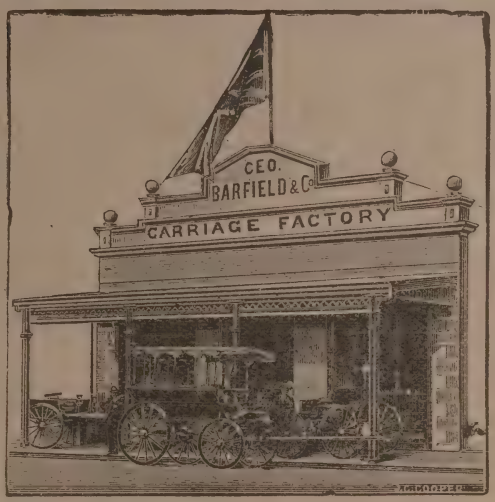
P.O. Groot Drakenstein, C.C.

P.O. Box 21 **GEORGE BARFIELD & CO.,** Telephone 391

212, Longmarket Street, Maritzburg.

Builders of High-Class Vehicles. Both for Town and Country Use.

New and Second-hand Vehicles always on Hand.



Estimates given for all kinds of Carriage Work.

Direct Importers.

The Trade supplied at most reasonable Prices.

The Wattle Extract Co.

16 & 17, ANGLO-AFRICAN HOUSE,

SMITH STREET, DURBAN.

—Buyers of—

WATTLE BARK

In Any Quantity. Prompt Settlements on Receipt of Goods.

Highest Prices Given. No Commission Charged.

- - CORRESPONDENCE INVITED - -

P.O. Box 734. Telegrams: "ATLANTIC."

YOU WANT

Seeds THAT Grow.

Ryegrass, Lucerne (Dodder Free), Paspalum, Turnip and Mangel Seeds. Broadleaved Rape and Thousand-headed Kale. Samples and quotations on application.

Mason's "PREMIER" Seeds

SEND FOR ILLUSTRATED SEED ANNUAL.

R. MASON & SON,

The Corn Exchange.

P.O. BOX 13.

Seedsmen, &c.,

289, CHURCH STREET,

Maritzburg.

DAILY - - ONE PENNY.

"Times of Natal."

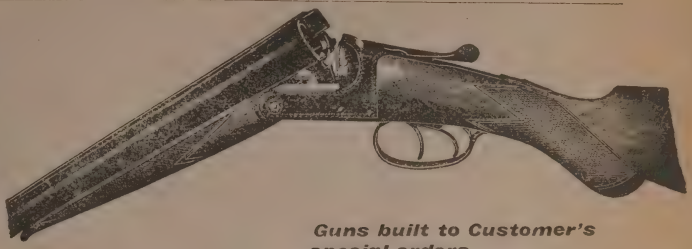
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Advertising Rates and all particulars on application to the

Times P. & P. Co., Ltd.,

PIETERMARITZBURG.

We guarantee that the same noted Guns and Rifles sold by us during the past years are still being stocked and made in the same factory in Birmingham.



Guns built to Customer's special orders.

The Popular Gunmakers,

SOUTH AFRICAN GUN WORKS,

(Late) Hillsdon & Hillsdon,

——MANUFACTURERS OF THE——

WORLD-RENOWNED FAR-KILLING GUNS AND RIFLES.

BIRMINGHAM AND CAPE TOWN.

South African Depot:—**S.A. GUN WORKS,**

The Armouries, 16, BURG STREET, CAPETOWN.

Illustrated Catalogue sent POST FREE on application.

ALL NEW GUNS AND RIFLES SENT CARRIAGE AND DUTY PAID.

HAYNE & CO.,

—— BUYERS OF ——

Mealies, Kafir Corn, Wattle Bark,

AND ALL SOUTH AFRICAN PRODUCE.

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—— SELLERS OF ——

Grain Bags, Coolie Rations, etc., etc.

Write for Quotations for FIRST-CLASS RELIABLE ENGLISH AND FRENCH SEED POTATOES.

72 & 74, COMMERCIAL ROAD, DURBAN.

—— *ALSO* ——

8, New Club Buildings, Main Street, JOHANNESBURG.

South Devon Cattle.

Celebrated for the Dairy. Mr. Vosper's cow Cowslip V. at the Royal at Gloucester (1909), against all comers in a class of 62, was awarded the Reserve in both milking trials and butter tests, giving after 114 days' lactation 58 lbs. of milk in 24 hours, producing 2 lbs. 8½ ozs. of butter with 4.20 per cent. of fat. South Devons are the heaviest cattle in the World, and produce beef of the highest quality. Pedigree Auction Sales at Totnes, South Devon, first weeks of October and April each year. All particulars of :—

ALFRED MICHELMORE, *Secretary Herd Book Society,*
Gate House, Totnes, ENGLAND.

England is the Home of Good Tailoring—
London the Fashion Centre of the World.

AN IMPORTANT SAVING
Can be effected if you order your clothes from London.

JOHN J. M. BULT,

Cash Tailor,
140, Fenchurch St., London, Eng.,
has a Special Department in his business for attending to the requirements of those abroad, where the same personal attention is given which has built up his reputation at home. He guarantees the best quality cloth the best styles also.

PRICES are as follows:

Frock Coat and Vest - -	from	**63/-**
Dress Suit (Silk-lined) - -	,,	**84/-**
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Norfolk and Knickers - -	,,	**63/-**

A choice of Tweeds, Flannels, Cheviots and Serges may be had. Kindly state which required—and the colour—when writing for patterns. Self-measurement forms on application. As a register is kept of all Customers' measures, an accurate fit is guaranteed.

RIDING BREECHES
cut on the most approved lines from 35/-

Address for Patterns and Self-measurement forms :—
J. J. M. BULT, P.O. Box 830, CAPE TOWN.

Mealies, Oats, Wattle Bark, Wool,

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Skins, Horns, Bones, Hoofs, etc.

— THE —

Natal Export Co., Ltd.,

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Are buyers of the above Products in any quantity.

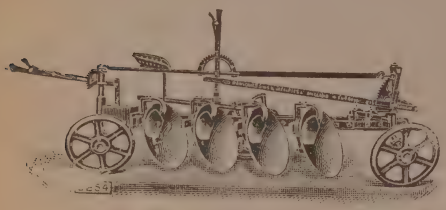
Terms: Prompt Cash on Delivery.

They will also undertake to consign Produce of any kind to the London Markets on behalf of Farmers and others on a commission of 2½ per cent., plus actual costs, and will advance 80 per cent. of the spot value on receipt of the goods.

LATEST CABLED INFORMATION AS REGARDS THE ENGLISH AND CONTINENTAL MARKETS IS ALWAYS AT THE DISPOSAL OF THEIR CLIENTS.

Office and Store:
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Two, Three and Four-Furrow

DISC PLOWS

Will break up the hardest VIRGIN VELDT.

They do Magnificent Work.

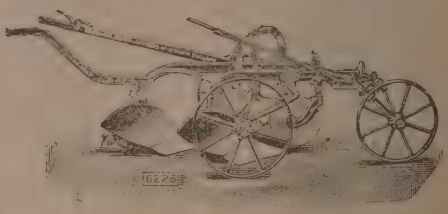
——— TRY ONE. ———

Ransomes'

Two and Three-Furrow

Invincible Plows

are made of Best Materials.



Are Strong and LIGHT OF DRAUGHT, and have good clearance under the beams for weeds. The wheels are dust proof.

———BE SURE AND GET ONE THIS SEASON.———



Osborne's

Cut-a-Way Disc Harrows

Are the Best ever imported into South Africa.

FITTED WITH WEIGHT CARRIERS AND TRANSPORT ATTACHMENT.

WRITE FOR PARTICULARS.

IF YOU ARE IN WANT OF

ANY Agricultural Implement

Write for Catalogue or call and Inspect our Stock.

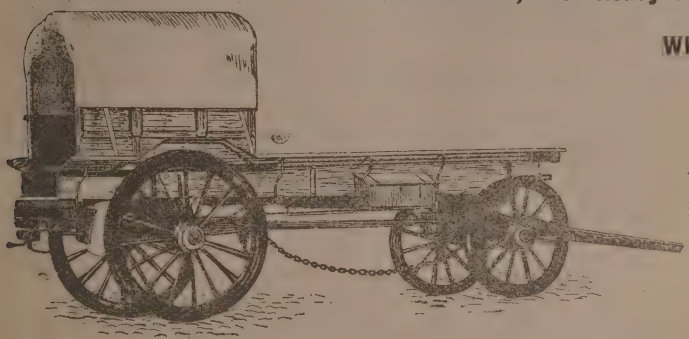
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J. MERRYWEATHER & SONS,

Wagonmakers, Blacksmiths, &c.,

Supply Wagons of every description on Shortest Notice and at Low Prices; Workmanship and Material Guaranteed. Tip Carts, Light Delivery Carts; also Light Spring Carts suitable for Farmers and Dairymen.

TROLLEYS, both Heavy and Light.



WHEELBARROWS.

All Sizes of Wheels in Stock or Made to Order.

Sneezewood, Stinkwood, Stinkwood Shafts Sawn or Bent to Shape, Forgings, either for Ploughs Wagons, or Mowing Machines.

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BY SPECIAL APPOINTMENT TO

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M'CRYSTAL & HARKNESS,

Saddlers and Harness Makers,

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WE ARE SPECIALISTS FOR

AGRICULTURAL SEEDS

We stock the following and many other varieties:—

Kale	***Serradella***	***Fescue***
Lucerne	***Cocksfoot***	***Paspalum***

C. Starke & Co., Ltd., Mowbray, C.C.

— WRITE FOR PRICE LISTS — —

QUIBELL'S . . DIPS.

CATTLE PASTE DIP.

The popularity of this famous Dip is still maintained. Its reputation for keeping Cattle and Horses in a healthy condition is known to almost every farmer.

SHEEP FLUID DIP (Non-Poisonous).

The most efficient emulsifying Dip on the market, without exception. Thousands of gallons sold in the Colony annually.

SHEEP POWDER DIP (Poisonous).

In cases containing 48 packets. Mixes readily, cures the SCAB, kills the parasites as they hatch from the egg; improves the wool.

DISINFECTANTS.

KEROL.

Awarded the Gold Medal for Disinfectants at the Franco-British Exhibition, London, 1908.

INFALLIBLE FLUID.

A powerful but cheaper Disinfectant.

KEROL SANITARY POWDER.

Guaranteed to be four times more powerful than a 15 per cent. Carbolic Powder.

Please order your Dips and Disinfectants through your Merchant.

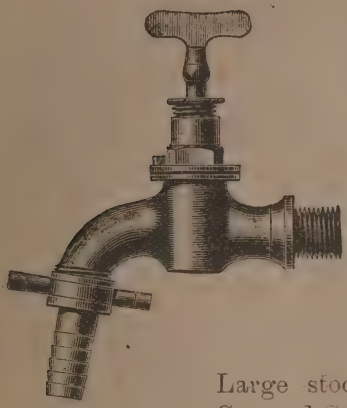
Agents—

A. J. KEELER & CO., Point, Durban.

City Representatives—

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PIPES FOR IRRIGATION.

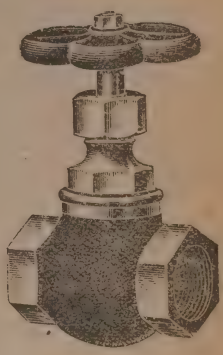


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Bolts & Nuts.



Large stocks of **TUBES** and **FITTINGS** for Water, Gas and Steam. Catalogues on application. . . .

H. INCLEDON & Co.

P.O. BOX 964. DURBAN. **363, SMITH STREET.**

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Telegraphic Address: POUPART, LONDON.

T. J. POUPART

(J. POUPART),
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COVENT GARDEN MARKET, LONDON, ENGLAND.

Has an unrivalled Clientele for the sale of all choice Fruits and Vegetables. Each department is managed by a competent and experienced Salesman, under the Supervision of the Principals.

Special attention given to all.

SOUTH AFRICAN FRUITS ***Now a LEADING FEATURE of the firm's enterprises : :***

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CITRUS FRUITS
NAARTJES
ORANGES.

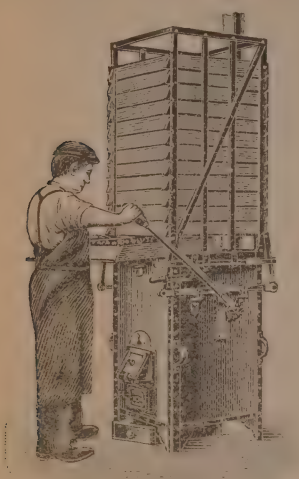
Promptitude with Account Sales and Settlements. Top prices always obtained for choice, well graded fruit . .

T. J. P. does not speculate, but sells on COMMISSION only. Therefore all senders receive impartial treatment.

References permitted to:— THE SOUTH AFRICAN TRADES COMMISSIONERS. Mr. F. HARRISON (Natal Government). Mr. C. DU P. CHIAPPINI (Cape Colony Government).

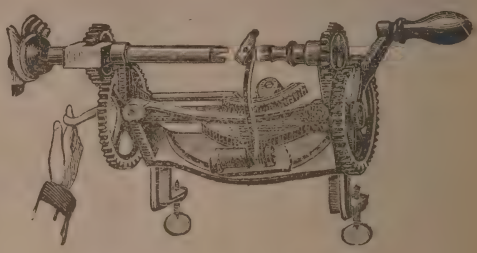
POUPART.

South African Representative: A. J. PALLENT, ***P.O. BOX 110, DURBAN. Also— P.O. BOX 421, PORT ELIZABETH.***



PEYCKE'S "TIGER" IMPLEMENTS. . .

PORT ELIZABETH.



EVAPORATORS. **FRUIT PARERS.**



"Tiger" Ploughs.

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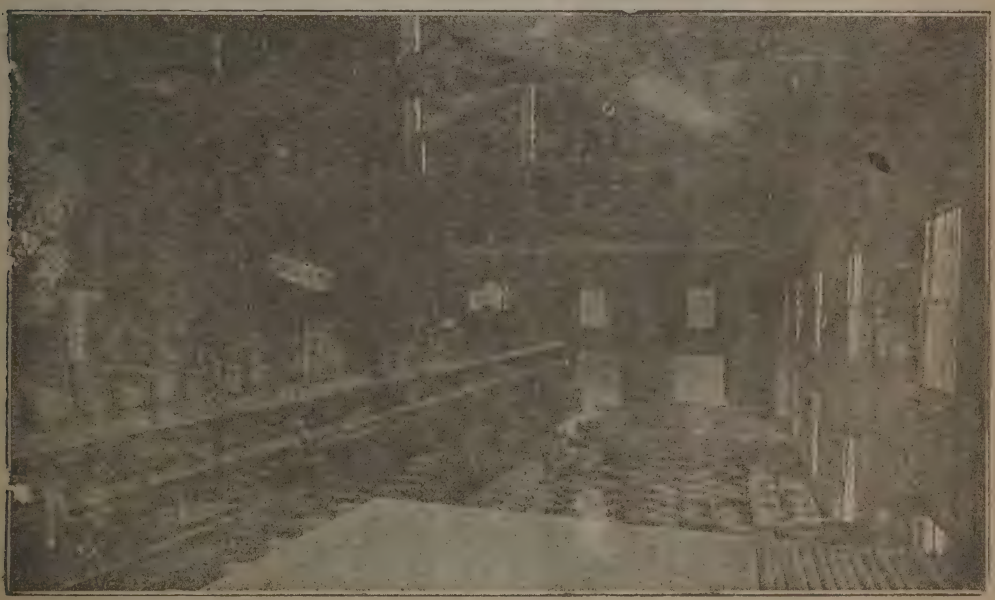
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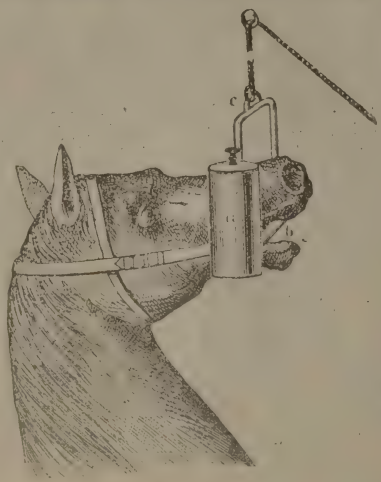
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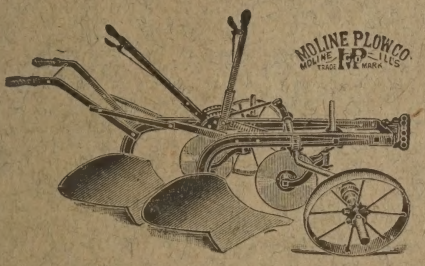
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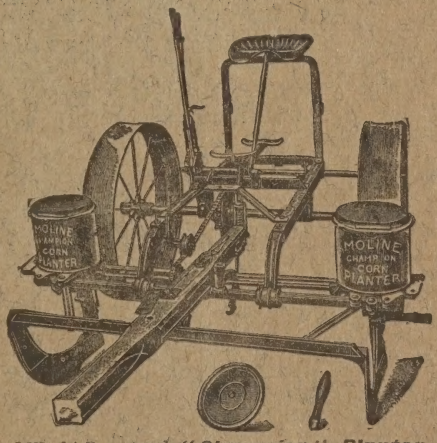
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